

The I-69 Evansville-to-Indianapolis Study  
Tier 1 Environmental Impact Statement



**Draft Level 2**  
**Alternatives Analysis Report**  
Task 5.3.5



October 16, 2001





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## **Introduction**

The purpose of this report is to document the process that has led to the screening of alternative route concepts down to a shortlist of routes recommended for further study. At the end of the report, the recommended routes are listed. The report addresses both the factors that have been considered in the analytical process and the reasons for the routes that have been selected for further study.

The report is organized under six headings.

- Part I describes the overall study process for this Tier 1 Environmental Impact Statement in order to provide some context for this report.
- Part II summarizes the factors considered in the screening process. These factors include the ability of the alternatives to achieve the project's transportation, economic development, and National I-69 objectives, as well as cost and geographic diversity.
- Part III describes the alternative route concepts that have been studied in the screening process. This section includes maps of each of the route concepts.
- Part IV summarizes the results of the analysis of the route concepts. This section summarizes the data for each performance measure. More detailed information is available in the Appendix and in technical reports that have been developed in the preparation of this document.
- Part V recommends five route concepts for further study, along with the reasoning behind the recommendations.
- Part VI describes the next steps in the study process, which involve the detailed environmental analysis of the five selected route concepts.

## **I. Process Overview**

This study is an environmental impact statement (EIS) for the Evansville-to-Indianapolis section of I-69 in Indiana. It is being conducted pursuant to the National Environmental Policy Act (NEPA) and the NEPA regulations issued by the Council on Environmental Quality (CEQ), 40 CFR Part 1500, and the Federal Highway Administration (FHWA), 23 CFR Part 771.

The CEQ and FHWA regulations require an EIS for only the largest highway projects. However, even in comparison to other projects that require an EIS, the Evansville-to-Indianapolis section of the proposed I-69 is unusual. There are several factors that set this study apart:

- The study area for an EIS usually lies within a single metropolitan area or rural transportation corridor. In this case, the study area includes 26 counties – approximately one quarter of the State of Indiana. Within the study area, there are major cities, mid-size cities, small towns, and rural communities.
- The purpose and need in an EIS usually consists of a relatively clear, limited set of objectives, such as providing additional capacity in a congested corridor. In this case, the project is intended to serve



numerous objectives across a broad geographic area. The diversity of the project's objectives – as reflected in more than 40 different performance measures – makes it difficult to draw clear-cut conclusions about whether an alternative “meets” the purpose and need. As will be shown below, each alternative serves *some* objectives well. Any decision about an alternative's ability to achieve the project's objectives *as a whole* will necessarily involve a degree of judgment.

- The route alternatives studied in an EIS typically are concentrated within a relatively limited geographic area. Often, just a few miles (or less) separate the alternatives from one another. In this case, the alternatives are spread across a much broader area. While they all connect the same termini, they serve different population centers and pass through different counties. For example, some alternatives serve Vincennes, and others do not; some serve Bloomington and others do not, some serve Bedford and others do not. The fact that different routes serve different communities further complicates the task of comparing alternatives.
- The range of alternatives in an EIS usually involves an analysis of alternative transportation modes – for example, transit vs. highway. However, in this case, the modal choice decision has already been made: this project is now part of a national transportation corridor that Congress has designated as I-69. For that reason, this EIS will focus on the evaluation of alternatives that involve the completion of an Interstate highway.

To accommodate this project's special characteristics, FHWA and INDOT have decided to use a “tiered” environmental process. The concept of tiering is authorized under CEQ and FHWA regulations, and is intended to be used for particularly large and complex projects. The basic idea behind tiering is that very large projects can be examined more effectively by breaking the analysis into two distinct stages, known as tiers.

We are currently preparing the Tier 1 EIS, which focuses on “big-picture” issues – most importantly, whether to complete I-69 and, if so, which corridor should be served by this highway in Southwest Indiana. We expect the Tier 1 process to conclude in late 2002. If a build alternative is selected at the end of Tier 1, we will then proceed with Tier 2 studies, which involve specific alignment decisions and the development of detailed environmental mitigation plans. The Tier 2 studies will be prepared for smaller, stand-alone projects within the selected corridor.

Within the ongoing Tier 1 EIS, the analysis of alternatives involves three levels, which are depicted in Figure 1 below. The three levels in Tier 1 include:

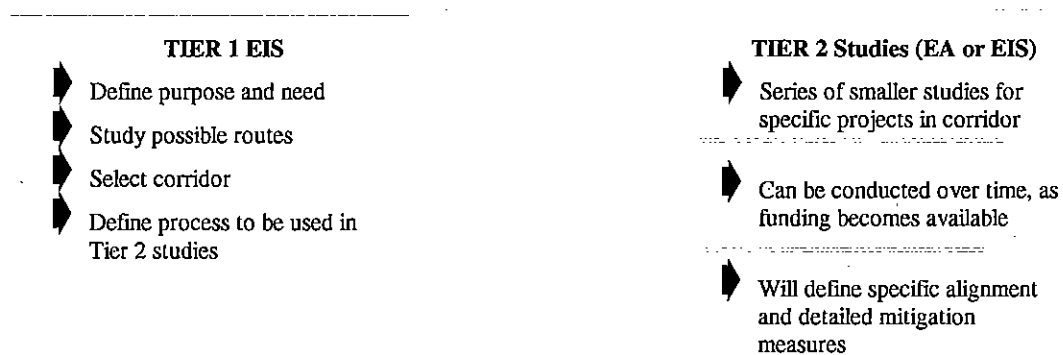
- **Level 1: Identifying alternatives (completed)** In Level 1, the study team developed 14 potential route concepts, which were announced in December 2000. Several of the 14 route concepts involved two “options” for connecting to Indianapolis. Altogether, taking into account the options, the team developed a total of 19 route concepts.
- **Level 2: Screening alternatives (just completed)** In Level 2, the study team analyzed how well each of the 19 route concepts would achieve the project's objectives as defined in the purpose and need statement. The study team also developed preliminary cost estimates
- **Level 3: Detailed analysis of alternatives (2001-2002)** In Level 3, the study team will conduct detailed environmental studies of the five routes that were carried forward at the end of Level 2. The analysis will include effects on land use, air quality, construction, historical and archaeological



preservation, endangered or threatened species, wetlands, wildlife, agricultural land, water quality and relocations. In addition to analyzing impacts on the physical environment, other impacts that will be considered include social, economic, secondary, noise and visual effects. Issues of performance and cost will continue to be considered in this stage of the study.

We are currently approaching the completion of Level 2. This report describes the set of alternatives that FHWA and INDOT intend to carry forward into Level 3. The report is being released for review and comment by resource agencies and the public, and it will be the focus of an upcoming round of public meetings. FHWA and INDOT will consider input received from resource agencies before making a final decision about which alternatives will be carried forward into Level 3.

**Figure 1: Tier 1 vs. Tier 2**



**Figure 2: Alternatives Analysis in Tier 1**





## **II. Considerations in the Level-2 Screening Process**

The purpose of the Level-2 Screening Process is to narrow the broad field of route concepts from fourteen (plus variants) to no more than five. This shortlist will then undergo environmental studies at a degree of detail appropriate for a first-tier environmental impact statement. For ease of reference, these environmental studies are collectively referred to as "Level 3".

Due to the wide range of alternative route concepts covering an area roughly one-fourth the size of the State, the primary focus of the Level-2 analysis is on a broad range of planning factors that relate primarily to the needs for and purposes of the highway.

These planning factors (also referred to as "performance measures") have been documented in the draft Purpose and Need Statement. Each factor relates to one of three broad areas. These are: (1) transportation, (2) economic development, and (3) national I-69 goals. See Table 1.

The performance measures have been forecasted out to the year 2025 using Indiana's Statewide Travel Model and a variety of computer programs designed to analyze the output of the model.<sup>1</sup>

These performance measures are quantitative. They provide useful tools for evaluating and comparing alternatives. Even so, the screening process itself is essentially qualitative. The evaluation of each alternative requires a judgment not only about the weight to be given to the individual performance measures, but also about how to balance performance measures as a whole against other factors. Two other factors, in particular, have been considered in this screening process:

- **Cost** A project the magnitude of I-69 will be expensive, regardless of the route. However, the routes vary widely in cost: the difference between the highest and lowest construction cost estimates is more than \$ 1 billion. Accordingly, cost has been considered in the evaluation of alternatives. Both capital costs and ongoing operation and maintenance (O&M) costs are analyzed.
- **Geographic Diversity** The geographic location of an alternative will determine, in many areas, the types of environmental impacts and the extent of those impacts. For example, alternatives located in a karst region will have certain impact on the natural environment that would be avoided by alternatives located outside a karst region; similarly, an alternative that upgrades substantial sections of an existing highway will have certain impacts on communities (displacements, loss of access, etc.) that will be avoided by alternatives constructed largely on new location. Thus, geographic diversity has been considered as a means of ensuring that the alternatives carried forward provide a wide range of options for minimizing impacts on the environment and on existing communities.

In brief, the Level-2 screening process takes into account the performance measures defined in the Purpose and Need statement, as well as geographic diversity and cost.

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<sup>1</sup> The Indiana Statewide Model is described in Technical Report 3.3.3: Model Development and Validation. A general description of the analytical process can be found in INDOT's Major Corridor Investment Benefit Analysis System.





### **III. Description of the Alternatives**

This section of the report will describe the alternatives and the way in which they were developed. Each alternative, including optional variations of the alternative, will be described.

#### **A. The Scoping Process**

Early in the study, meetings were held with federal and state review agencies to help frame the major issues and design a process for conducting the study. An additional aspect of those meetings was to “scope” the range of alternatives that should be studied. Two corridor concepts (i.e., “D” and “K”) originated from suggestions made in those meetings. Similarly, three public meetings were held out of which Route “G” arose as a variation of “F”. In addition to these outreach efforts, previous studies were examined to ensure that the work of others was considered in the scoping of alternatives.

#### **B. Route Descriptions**

The following describes in very general terms the route concepts that have been evaluated in this phase of the study. It is critical to understand that these routes are only conceptual. Specific alignments have not been developed. Following the completion of the Level 2 screening process, corridors (approximately 2000 feet in width) will be identified for those route concepts that are advanced to Level 3 for further study. Within those corridors, at least one “working alignment” will be developed in order to estimate environmental impacts. Included on the following pages are route concept maps.

##### **Route Concept “A”**

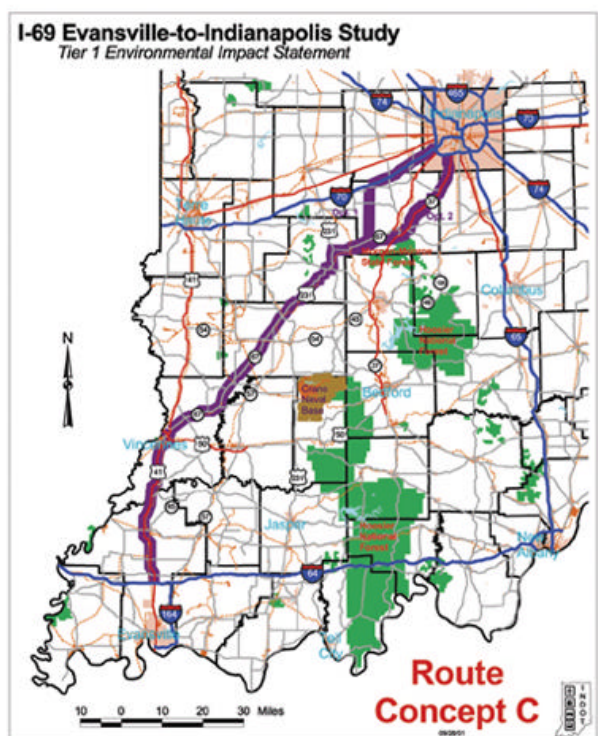
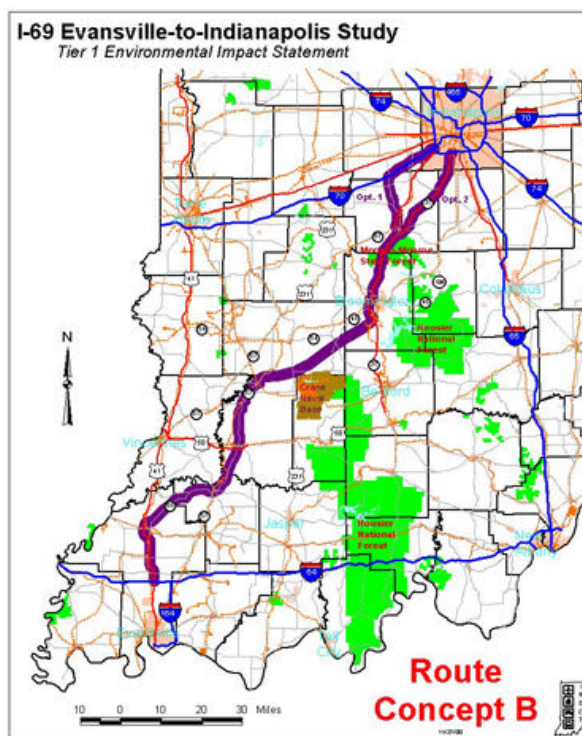
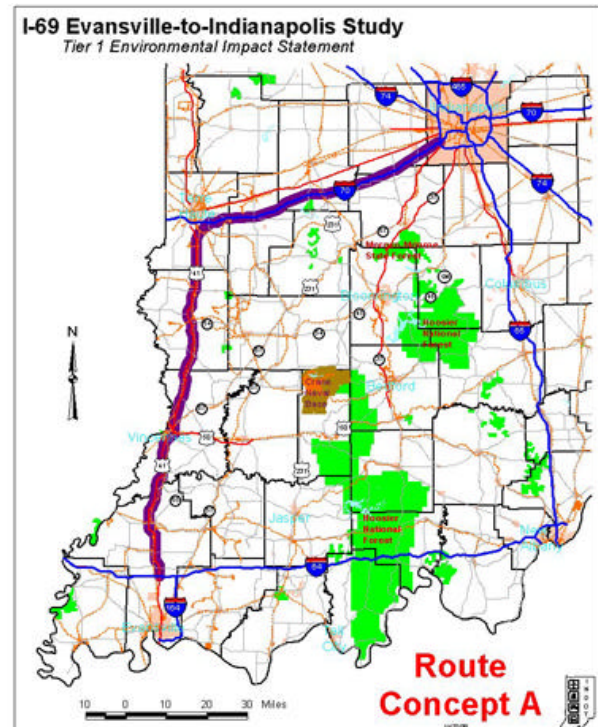
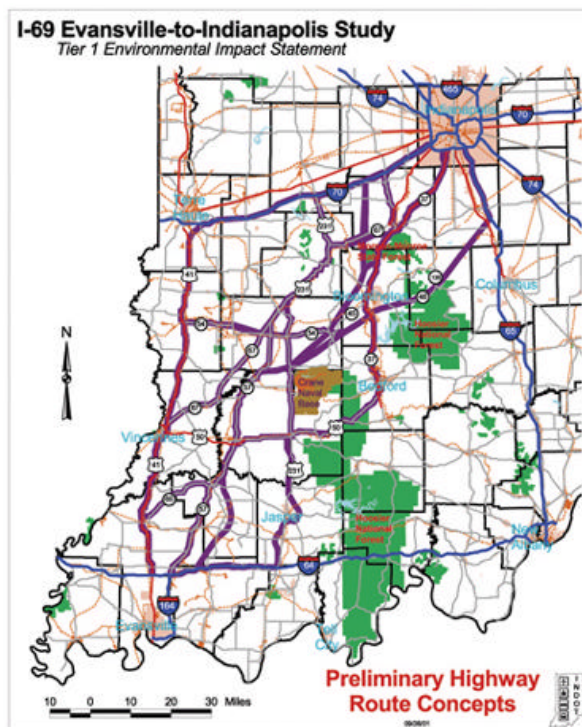
Route Concept A consists of about 155 – 158 driving miles from I-64 / US 41 to I-465. However, it is important to note that the length of construction is only about 90 miles, since *INDOT has decided to treat the widening of I-70 between Terre Haute and Indianapolis from 4 to 6 lanes as a “committed project” regardless of the outcome of this study.* This route concept begins at the US 41 / I-64 interchange, and makes use of the US 41 corridor, northward to the proposed SR 641 Terre Haute bypass. Some options would be considered through or around Fort Branch, Vincennes, and Farmersburg. This route concept then uses the SR 641 bypass to I-70, and I-70 from SR 641 to I-465.

##### **Route Concept “B”**

Route Concept B consists of about 147 – 156 driving miles from I-64 / US 41 to I-465. The route begins at the US 41 / I-64 interchange, and makes use of the US 41 corridor, northward to SR 65. Some alternative alignments would be considered through or around Fort Branch. This route concept then follows the SR 65 corridor, northeast, to just north of the East Fork of the White River. It then travels along the SR 57 corridor to near the Daviess / Greene County Line (near Elnora). Optional alignments would be considered to bypass Washington. It then travels northeast cross-country to SR 37 (near Bloomington). Then, it travels along the existing SR 37 corridor to SR 39. Two options would be considered to bring this route concept from SR 39 to I-465. Route “B-1” would travel along the SR 39 corridor northward to I-70, then take I-70 to I-465. The second option, “B-2” would use the SR 37 corridor to I-465. For portions of the SR 37 corridor, new alignments would be considered.



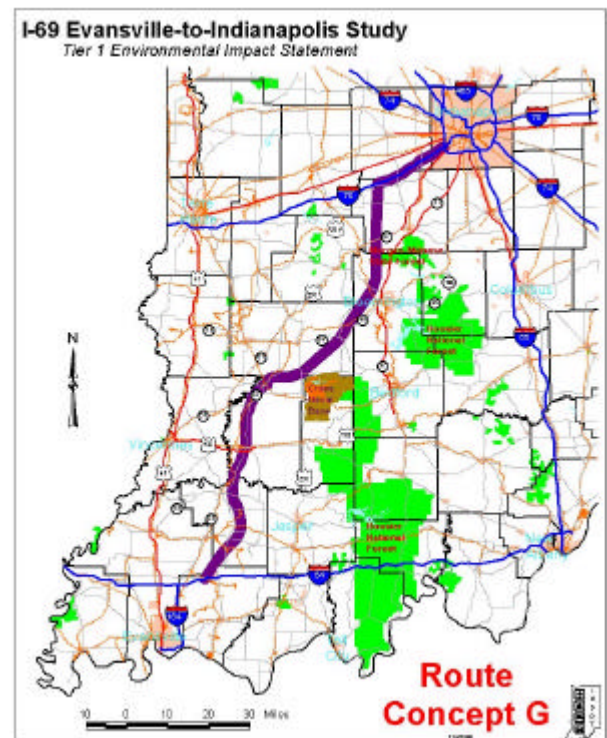
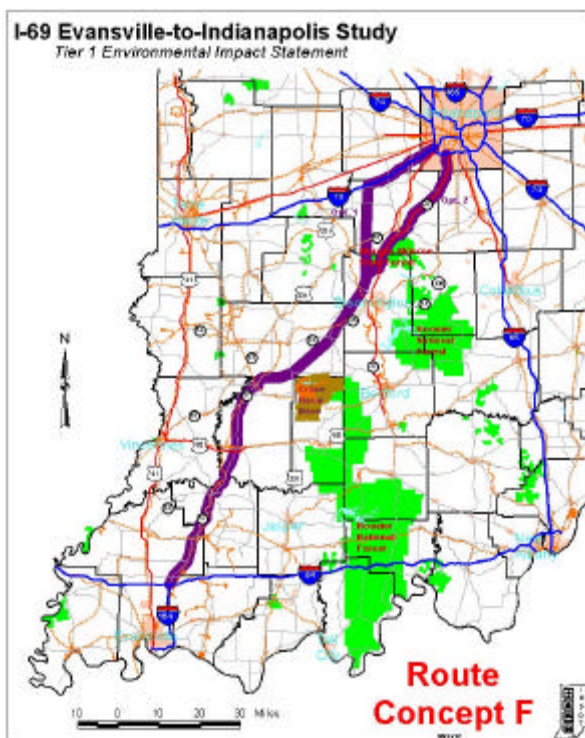
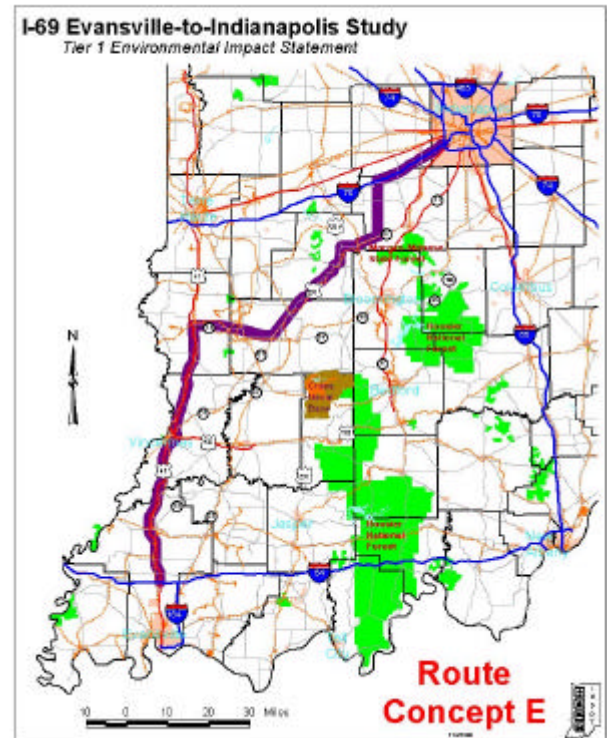
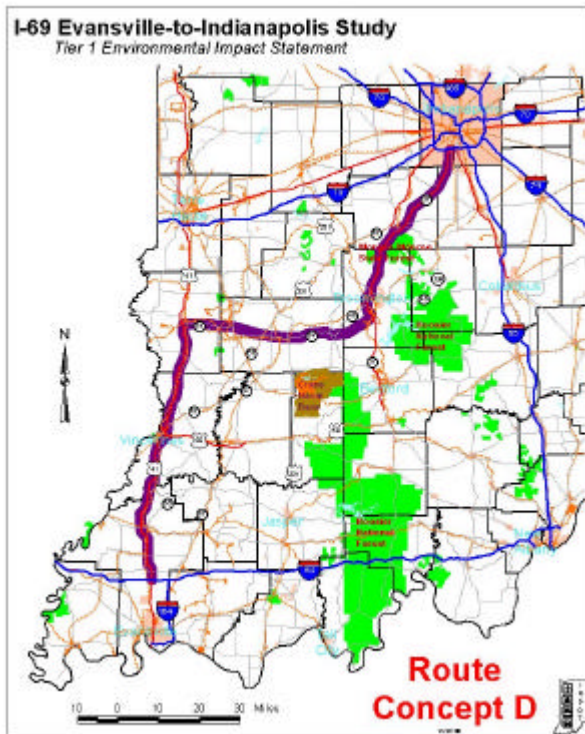
Figure 3: Route Concept Maps



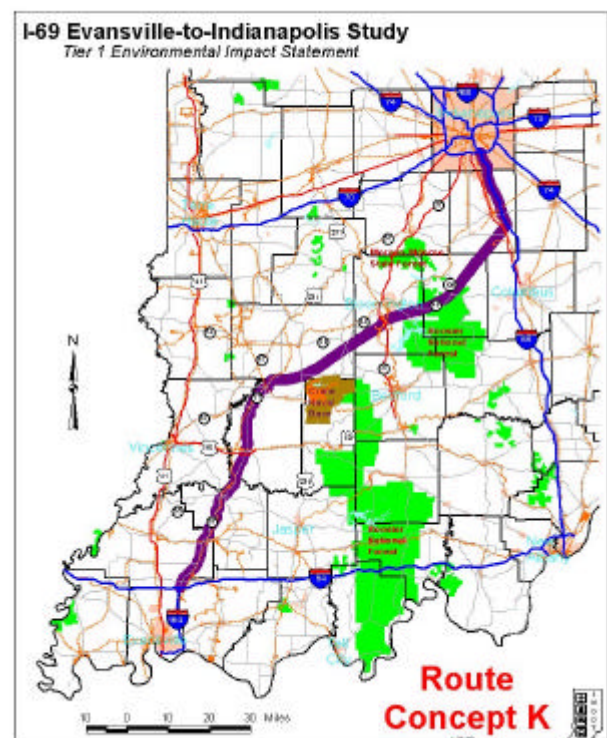
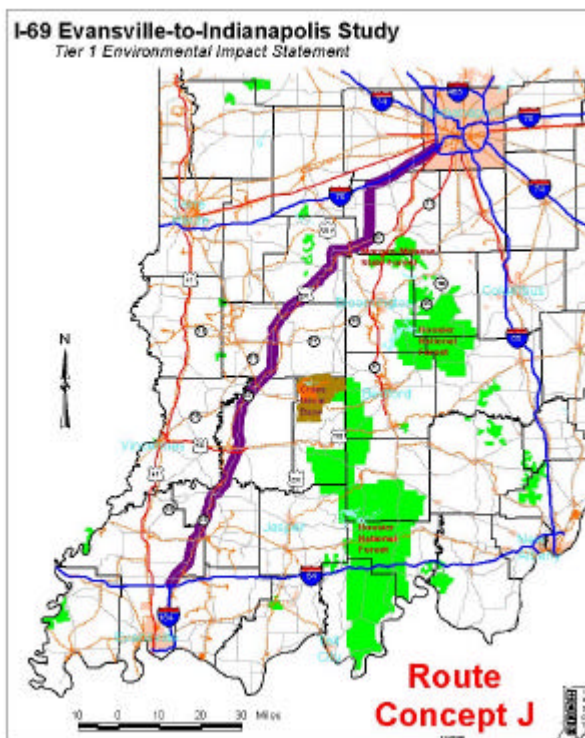
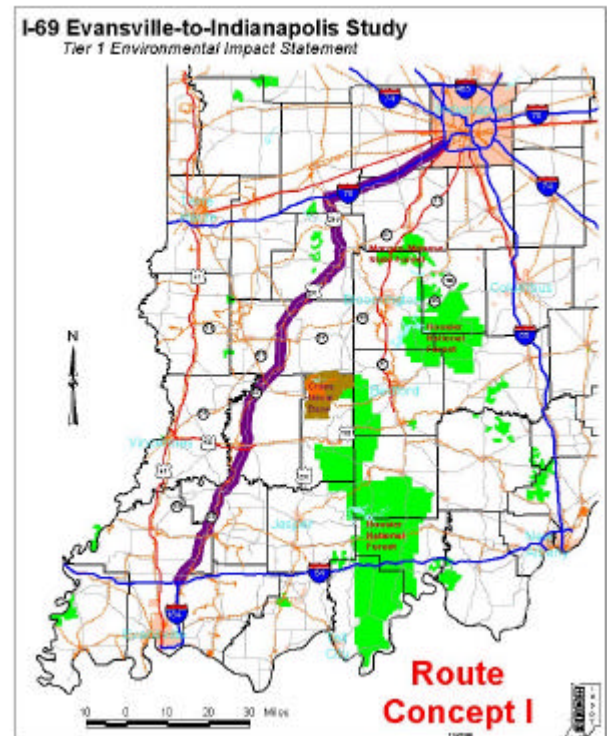
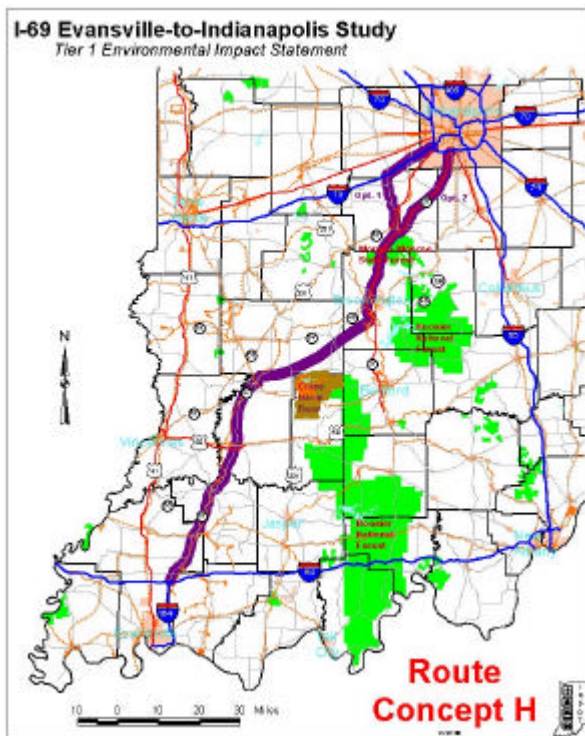


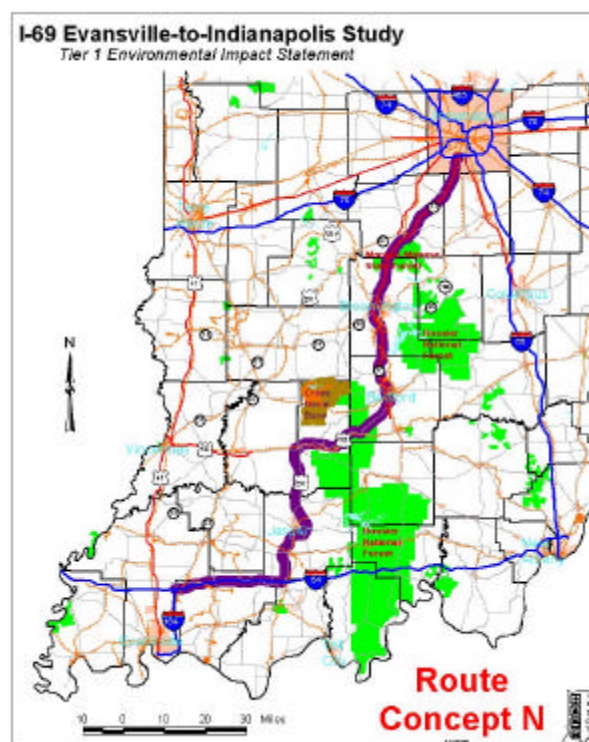
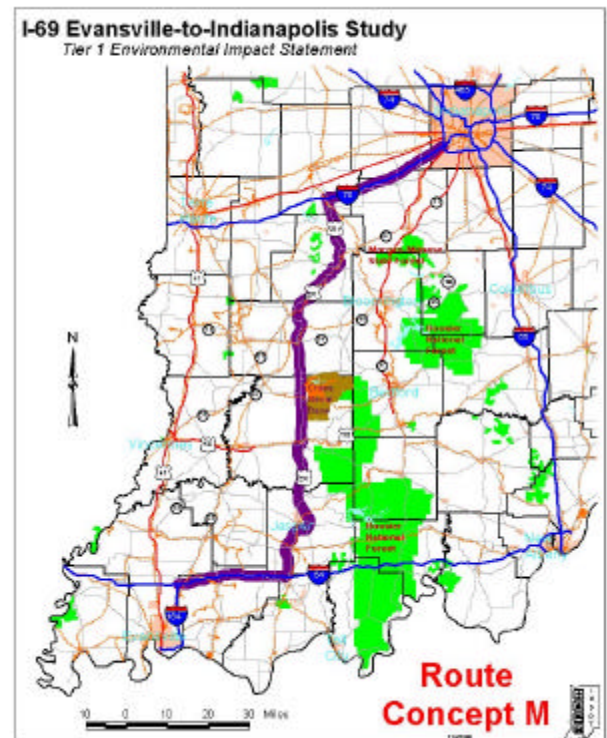
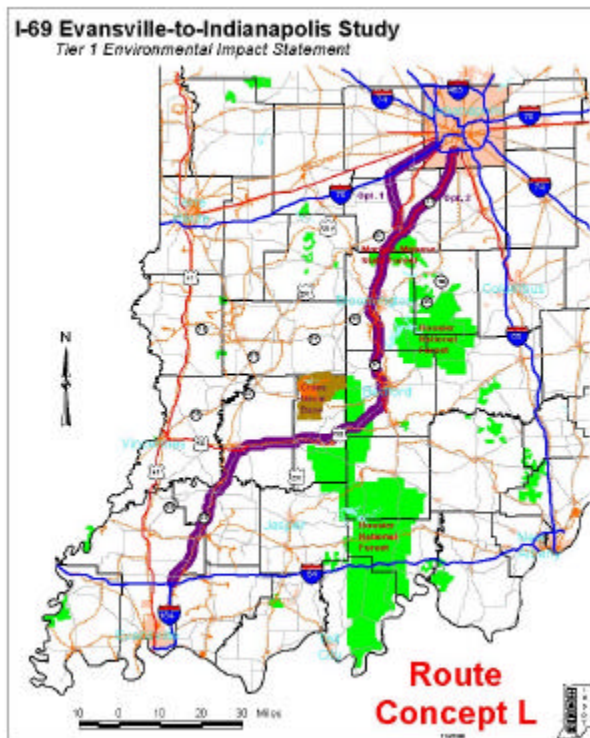


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## Route Concept “C”

Route Concept “C” is about 146 – 149 driving miles from I-64 / US 41 to I-465. This route concept begins at the US 41 / I-64 interchange, and makes use of the US 41 corridor, northward to SR 67. Some alternative alignments would be considered through or around Fort Branch and Vincennes. Route “C” then follows the SR 67 corridor to Paragon, in Morgan County. *During the course of this study, a second option for the northern portion of this route (from a point near Paragon on SR 67) was added to the original concept. The original concept is now referred to as “C-1” and the second concept as “C-2”.* Route Concept “C-1” would travel cross-country from a point at or near Paragon, northward, in Morgan County to I-70. Alternative alignments would be considered between Paragon and I-70. This route concept would then make use of I-70 to I-465. “Route Concept C-2” would continue along the SR 67 corridor east of Paragon until reaching the SR 39 bypass, which connects SR 67 and SR 37 south of Martinsville. At that point, Route Concept “C-2” would diverge from SR 67 and connect to SR 37, and would then proceed northward along the SR 37 corridor to I-465.

## Route Concept “D”

Route Concept “D” consists of about 164 – 168 driving miles from I-64 / US 41 to I-465. This route concept begins at the US 41 / I-64 interchange, and makes use of the US 41 corridor, northward to near SR 54. Some alternative alignments would be considered through or around Fort Branch and Vincennes. Route Concept “D” then travels along the SR 54 corridor, northeast to a point west of SR 45. From this point, the route concept travels cross-country to SR 37, near Bloomington. It follows the SR 37 corridor north to I-465. For portions of the SR 37 corridor, cross-country options would be considered.

## Route Concept “E”

Route Concept “E” is about 150 – 153 driving miles from I-64 / US 41 to I-465. This route concept begins at the US 41 / I-64 interchange, and makes use of the US 41 corridor, northward to near SR 54. Some alternative alignment would be considered through or around Fort Branch and Vincennes. This route concept then travels along the SR 54 corridor northeast to a point near SR 67. It follows the SR 67 corridor in an easterly direction to Paragon in Morgan County. The route then travels cross-country from Paragon to I-70. Alternative alignments would be considered to bring I-69 from Paragon to I-70. The route concept then travels on I-70 to I-465.

## Route Concept “F”

Route Concept F consists of about 141 – 142 driving miles from I-64 / I-164 / SR 57 to I-465. This concept begins at the I-64 / I-164 / SR 57 interchange, and follows the SR 57 corridor northeast to Newberry in Greene County. Two different concepts would be considered to bypass Washington. Route “F” then travels cross-country, east, from Newberry to US 231; then northeast to around SR 46 near Ellettsville in Monroe County. *During the course of this study, a second option for the northern portion of this route (from near Ellettsville to I-465) was added to the original concept. The original concept is now referred to as “F-1” and the second concept as “F-2”.* The first option (“F-1”) travels cross-country, north to I-70. Alternative alignments would be considered between Paragon in Morgan County and I-70. “F-1” then travels along I-70 to I-465. The second alternative



("F-2") travels cross-country to SR 37 and uses the SR 37 corridor to I-465. For portions of the SR 37 corridor, new alignments would be considered.

### **Route Concept "G"**

Route Concept "G" consists of about 142 – 143 driving miles from I-64, east of I-164 / SR 57, to I-465. This route concept travels cross-country from I-64 (east of the I-164 / SR 57 Interchange) to SR 356. It then travels along the SR 57 corridor to Newberry, in Greene County. Some alternative alignments would be considered to bypass Washington. This route concept then travels cross-country east, from Newberry to US 231; then northeast to around SR 46 near Ellettsville in Monroe County; and north to I-70. Some alternative routings would be considered between Paragon in Morgan County and I-70. This route concept then travels along I-70 to I-465.

### **Route Concept "H"**

Route Concept "H" consists of about 139 – 146 driving miles from I-64 / I-164 / SR 57 to I-465. This route concept begins at the I-64 / I-164 / SR 57 interchange, and follows the SR 57 corridor, northeast to Newberry in Greene County. Some alternative routings would be considered to bypass Washington. Route Concept "H" would travel cross-country, east from Newberry to SR 37 near Bloomington. Then, it would travel along the SR 37 corridor to SR 39. This route concept has two major options between SR 39 to I-465. The first option ("H-1") travels along the SR 39 corridor, northward to I-70 and then takes I-70 to I-465. The second option ("H-2") uses the SR 37 corridor to I-465. For portions of the SR 37 corridor, new alignments would be considered.

### **Route Concept "I"**

Route Concept "I" consists of about 143 driving miles from I-64 / I-164 / SR 57 to I-465. This route concept begins at the I-64 / I-164 / SR 57 interchange, and follows the SR 57 corridor, northeast to SR 67. Alternative routings would be considered to bypass Washington. It then uses the SR 67 corridor proceeding northeast to US 231, where it will follow the US 231 corridor north to I-70. This route concept then travels on I-70 to I-465.

### **Route Concept "J"**

Route Concept "J" consists of about 141 – 142 driving miles from I-64 / I-164 / SR 57 to I-465. This concept begins at the I-64 / I-164 / SR 57 interchange, and follows the SR 57 corridor, northeast to SR 67. Alternative routings would be considered to bypass Washington. It then uses the SR 67 corridor proceeding northeast to Paragon in Morgan County. From this point, it travels north cross-country to I-70. Optional routings would be considered between Paragon and I-70. Route Concept "J" then travels on I-70 to I-465.

### **Route Concept "K"**

Route Concept "K" is about 152 driving miles from I-64 / I-164 / SR 57 to I-465. This route begins at the I-64 / I-164 / SR 57 interchange, and follows SR 57, northeast to Newberry in Greene County. Optional routings would be considered to bypass Washington. The route concept then travels cross-country, northeast from Newberry to SR 37 near Bloomington. From this point, it travel cross-



country to SR 46 near the Monroe / Brown County Line. The route concept then uses the SR 46 corridor to SR 135 near Nashville. It then travels cross-country northeast from SR 135 to I-65. This route concept then proceeds along I-65 to I-465.

### **Route Concept “L”**

Route Concept “L” consists of about 146 – 152 driving miles from I-64 / I-164 / SR 57 to I-465. This route concept begins at the I-64 / I-164 / SR 57 interchange, and follows the SR 57 corridor, northeast to US 50 near Washington. Some alternative alignments would be considered to bypass Washington. Route “L” then travels along the US 50 corridor in an easterly direction to SR 37, where it follows the SR 37 corridor to SR 39. Route Concept “L” has two major options from SR 39 north to I-465. “L-1” travels along the SR 39 corridor northward to I-70, and then takes I-70 to I-465. “L-2” uses the SR 37 corridor to I-465. For portions of the SR 37 corridor, new alignments would be considered. *The US 50 corridor between Washington and Bedford has been identified for potential improvement to a four-lane facility in the Statewide Long-Range Plan. Accordingly, the preliminary cost estimate for these improvements has been deducted from the cost of Route Concept “L”. (See Table 4 below.)*

### **Route Concept “M”**

Route Concept “M” consists of about 161 driving miles from I-64 / I-164 to I-465. This route concept begins at the I-64 / I-164 / SR 57 interchange and travels east along I-64 to US 231. At this point, the route concept travels north on the proposed upgrade/relocation of the US 231 corridor near Jasper and Huntingburg. From Jasper, this concept utilizes the US 231 corridor to its interchange at I-70. The route concept then travels along I-70 to I-465.

### **Route Concept “N”**

Route Concept “N” consists of about 159 – 161 driving miles from I-64 / I-164 to I-465. It begins at the I-64 / I-164 / SR 57 interchange and travels east along I-64 to US 231. It turns north on the proposed upgrade/relocation of the US 231 corridor. It then utilizes the US 231 corridor to US 50 and travels east along the US 50 corridor to SR 37. The route concept then makes use of SR 37 north to I-465.





### III. Evaluation of the Alternatives

Key to the evaluation of the route concepts is the development of performance measures. These performance measures serve as “yardsticks” for assessing the degree to which an alternative achieves an intended goal. They also provide a basis for comparing the relative performance of the alternatives.

The performance measures for this project were first developed in the draft Purpose and Need Statement. Each performance measure relates to a specific need and associated goal. The performance measures are numerous and varied in order to ensure that the alternatives analysis and the subsequent screening process is not overly dependent on a small number of factors.

Each performance measure is associated with one of ten “project goals.” Table 1 identifies all of the performance measures, which are grouped by project goal. Some of these project goals are central to the purpose of and need for I-69, and therefore are referred to as “core objectives.” The core objectives are given greater weight in the screening of alternatives.

The performance measures are quantified in many different units of measurement. For example, proximity measures are tabulations of the population within a specified number of minutes from a city or some other important destination(s). In this case, the unit of measurement is people. On the other hand, safety data are measured by the number of vehicular crashes and business cost savings is measured in dollars. Another complicating factor is that in some cases more is better; in some cases, less is better. For example, a route concept that provides a shorter travel time between Evansville and Indianapolis is better (at least on that performance measure) than one with a longer travel time. By contrast, a route concept that can be expected to stimulate more jobs is better than one that would stimulate fewer.

*In order to simplify the analysis and reduce these potential sources of confusion, all performance measures have been converted from their original unit of measure to a value that has been scaled between 0 and 100. Moreover, all performance measures in which less is better have been inverted and scaled on the same 0 – 100 yardstick. In other words, the alternative with the poorest score is always indexed to 0 and the alternative with the best score is always indexed to 100. The adoption of this scoring practice allows for simple comparisons between totally different types of measures. It also provides a better sense of the relative performance of each alternative than a simple ranking.*

Another analytical practice has been to compute an *average composite score* for each family of performance measures. This practice has simplified the analytical process; now, we only have to look at 10 sets of scores rather than 40. Moreover, this practice has reduced the possibility that performance measures that tend to measure the same thing are double-counted.

For those who are interested in the raw values of the individual performance measures, these may be found in the appendix along with their respective scaled scores. (The appendix will be available on the project website in the near future.)



**Table 1: Performance Measures**

Category	Project Goal (Bold: Core Objective)	Performance Measures	
Transportation	<b>Improve Evansville-Indianapolis Linkage</b>	Travel Time Savings	Free flow travel time Average daily travel time
	<b>Improve Personal Accessibility</b>	Highway Usage	% vehicle-miles on major hwys % vehicle-hours on major hwys
		Accessibility Indices	Access to population Access to employment Pop-weighted access to emp.
		Population Proximity Tabulations	Within 1, 2, & 3 hr. radii of Indy 1 hr. radius of major educ. Inst. ½ hr. radius of urbanized areas
	Reduce traffic congestion	Congestion Measures	V/C ratio on major highways % congested lane-miles % congested vehicle-miles % congested vehicle-hours
			% delayed vehicle-hours Efficient System Perf. Index
	Improve traffic safety	Crash frequency reduction	Number of fatal crashes Number of injury crashes Number of PDO crashes
Economic Development	Increase monetary user benefits	Business and household spending savings	Mobility cost savings Crash reduction cost saving Vehicle operating cost savings
	Improve business accessibility	Proximity to markets	Access to labor/cons. markets Access to buyer/supp. markets
	Support sustainable, long-term economic growth	Employment	Net change in employment Employment in high growth ind. Employment in high paying ind.
		Income	Net change: disposable income Net change: farm/forest income
		Sales	Change in roadside bus. sales
	Support economic dev't that benefits a wide spectrum of SW Indiana residents	Employment	Employment-to-labor force ratio
		Income	Change: dispos inc.-per-capita % change in transfer payments
		Demographics	Working-age population
National I-69	<b>Facilitate interstate and international trade flows</b>	Design concept compatibility	Termini Design standards
		Shipping Efficiency	Truck vehicle-hour savings
	Connect to intermodal facilities	Intermodal/Port Access	Intermodal accessibility index



On the following pages, a summary of the results is provided. The results are organized according to the ten project goals, which are grouped into the usual three categories – transportation, economic development, and National I-69. The discussion of each project goal follows the same basic format:

- ✓ A brief statement of the project goal is provided and whether or not it is a “core” goal.
- ✓ The performance measures relevant to the project goal are identified and, when needed, a brief non-technical definition is given.
- ✓ A bar chart is then provided that shows the scaled, composite scores (i.e., 0 - 100) for each of the route concepts. (In a few cases, performance measures have been grouped into “sub-families.” In these cases, a composite score is the average of the sub-families’ composite scores.)
- ✓ Finally, a brief, qualitative discussion of the results is provided, which includes a listing of the five highest-ranking route concepts.

## **A. Transportation Performance Measures**

### **1. Connection between Evansville and Indianapolis**

It has been found that Evansville ranks last or near last among 12 major urban centers in Indiana and adjoining states in terms of its highway connection to Indianapolis. It is a *core goal* of this project to improve the linkage between Evansville and Indianapolis.

The performance measures that have been used to evaluate the effectiveness of alternative route concepts at improving the connection between Evansville and Indianapolis are travel times between I-64 (at either US 41 or I-164) and I-465. Both free flow and average or typical travel times (which take into account congestion levels over a 24-hour period) were used in this analysis. Table 2 summarizes the typical congested travel time and time savings associated with each alternative.



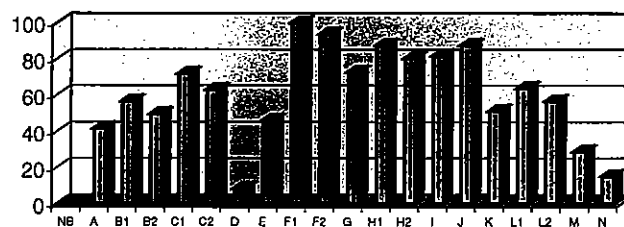
**Table 2: Route Concept Typical Travel Times and Travel Time Saving**  
(in minutes)

Alternatives	Travel Times	Savings
NB	171	-
Alt A	159	12
Alt B1	155	17
Alt B2	157	15
Alt C1	151	20
Alt C2	153	18
Alt D	169	3
Alt E	158	14
Alt F1	141	30
Alt F2	143	28
Alt G	149	23
Alt H1	145	27
Alt H2	147	25
Alt I	146	25
Alt J	145	27
Alt K	155	17
Alt L1	151	20
Alt L2	153	18
Alt M	160	11
Alt N	165	7

**Source:** Bernardin, Lochmueller & Associates, Inc. September 2001. Travel times assume no stops except at traffic signals and typical congestion levels over a 24-hour period. Congestion levels are based on forecasted traffic volumes for 2025. "NB" denotes the No-Build Alternative.

In this family of performance measures, six route concepts have scores of 80 or above. There is a fairly significant drop in scores below this cluster of six top performers. In descending order from 1<sup>st</sup> place, the top-ranking route concepts, starting with the best are: "F-1", "F-2", "H-1", "J", "H-2", and "T". "H-1" and "J" are effectively tied.

**Figure 4: Evansville-Indy Connection Composite Scores**



Note: Scores represent the improvement provided by the alternative in 2025 scaled to a range of 0 to 100. "NB" is the No-Build alternative.

Figure 4 graphically depicts the average composite scores for this family of performance measures. Numeric values can be found in the appendix.



## **2. Personal Accessibility**

The second core goal of I-69 in Indiana is to improve accessibility for the residents of Southwestern Indiana. The draft Purpose and Need Statement established that Southwestern Indiana has poorer access to population centers, jobs, major airports and other centers of activity than most of the rest of the State. Moreover, this lack of accessibility is not solely a function of geographic remoteness.

The family of performance measures used to evaluate the improvement in regional accessibility is comprised of three sub-families of measures. These sub-families are (1) accessibility indices, (2) proximity tabulations, and (3) the percentage of total forecasted vehicle-miles of travel on major highways (i.e., Interstates and other principal arterials). Each of these concepts is explained below.

**Accessibility Indices.** An accessibility index is a mathematical measure of access based on the size of the population (or employment or airplane departures, etc.) at various destinations and the highway travel time to those destinations. All things being equal, as travel times are reduced (either from faster speeds on existing facilities or the construction of a new road), the accessibility index becomes a larger number.

Accessibility indices computed by the statewide transportation model were used in the Purpose and Need Statement to demonstrate the finding that Southwestern Indiana is disadvantaged in terms of regional accessibility. Three of the most fundamental of these indices have been used to measure the improvement in accessibility of the proposed route concepts. Specifically, these are: an accessibility-to-population index, an accessibility-to-employment index, and a population-weighted accessibility-to-employment index.

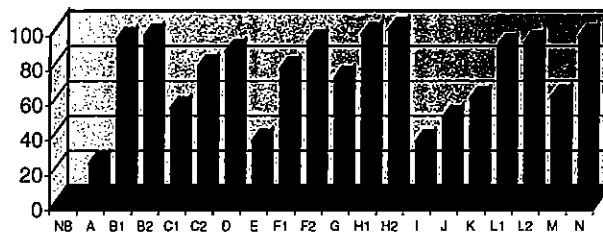
**Population Proximity Tabulations.** Population proximity tabulations are the sum of total population within a specified highway travel time of an important destination. The proximity tabulations used in this analysis are: (1) the population within 1, 2, and 3 hours of Indianapolis; (2) the population within 1 hour of major educational institutions in the I-69 Study Area, and; (3) the population within a half-hour of urbanized areas located in the I-69 Study Area (i.e., Indianapolis, Terre Haute, Bloomington, and Evansville). The educational institutions used in this analysis are Indiana University, Indiana State University, the University of Evansville, and the University of Southern Indiana.

**Percentage of Vehicle-Miles on Highways.** Another way of measuring accessibility is to compute the percentage of total vehicle-miles in the transportation system making use of high-capacity highways. The higher the percentage of total traffic using Interstates and other principal arterials, the greater the accessibility provided by the system.

An examination of the composite scores shows that those route concepts which directly serve the most populated regions in Southern Indiana performed better than those which do not. The best performing eight route concepts for personal accessibility have scores of 90 or higher. In descending order, these top eight ranking alternatives are: "H-2", "H-1", "B-2", "N", "B-1", "F-2", "L-2", and "L-1". After the 9<sup>th</sup> ranked route (i.e., "D"), there is a significant drop in the scores.



**Figure 5: Composite Personal Accessibility Scores**



**Route Concept**

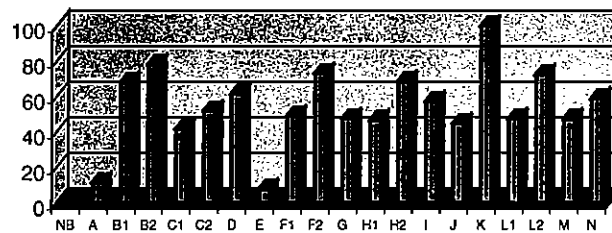
Note: Scores do not equal percentage improvement. They represent the improvement provided by each route concept scaled from 0-100. NB is No-Build.

Figure 5 shows the average composite scores for personal accessibility. Note that these scores are the average of the three sub-families' composite scores. More detailed data may be found in the appendix.

### 3. Traffic Congestion

The draft Purpose and Need Statement did not find that congestion is or would be a pervasive problem throughout most of Southwestern Indiana. However, clearly there are localized problem spots near developed areas for which the highway is viewed as an opportunity to reduce forecasted congestion. Accordingly, the lessening congestion is a goal of I-69, although not a core goal.

**Figure 6: Composite Congestion Performance Scores**



**Route Concepts**

Note: Scores represent the improvement provided by the alternative in 2025 scaled to a range of 0 to 100. "NB" is the No-Build alternative.

There are numerous methods to measure congestion levels. Several of these methods are used as part of this family of performance measures. Details are available in the appendix.

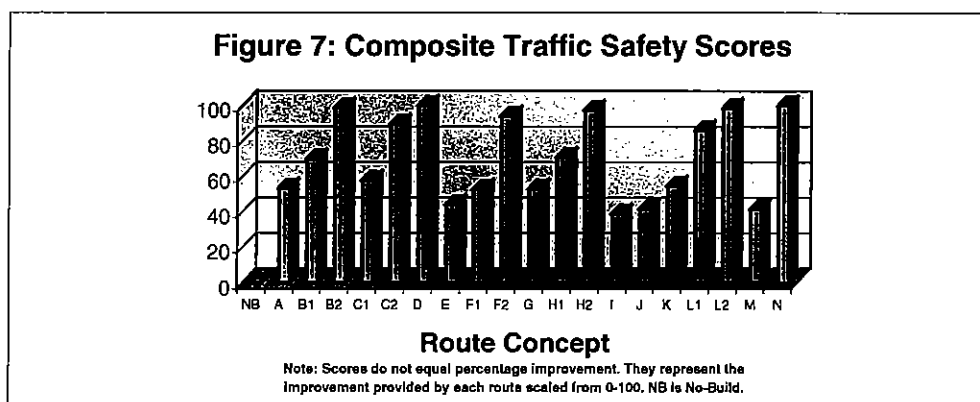
Figure 6 depicts the results of the congestion analysis. Clearly, Route Concept "K" stands out in a group by itself. This is due to the fact that it helps to relieve serious forecasted congestion problems on I-65. Other alternatives that use the SR 37 corridor also tend to perform well, in part for the same reason as "K"; they compete with I-65 as an alternate route servicing Indianapolis from the south. These routes tend to cluster together with fairly comparable scores in the high 60s and 70s. They are: "B-2", "F-2", "L-2", "H-2", and "B-1". Other routes have scores significantly less than this group.



## 4. Traffic Safety

The draft Purpose and Need demonstrated that there are areas of rural Southwestern Indiana that experience significantly higher serious crash rates than rural Indiana as a whole. Accordingly, the improvement of traffic safety was adopted as a goal of I-69. While traffic safety is understood to be a legitimate need, it is not deemed to be of a magnitude to warrant designation as a core objective.

The expected improvement in the frequency of fatal, injury, and “property damage only” (PDO) accidents comprise this family of performance measures. In this analysis, the composite score is the average of the reduction in the scores of each type of accident. (The next group of performance measures weights the three types of crashes based on their seriousness using monetary value as the weighting scheme.)



As depicted in Figure 7, seven route concepts cluster together with scores in the 90s and high 80s. In descending order, these top performers are: “D”, “N”, “B-2”, “L-2”, “H-2”, “F-2”, C-2”, and “L-1”. Following these alternatives, there is a significant drop in scores.

## B. Economic Development Performance Measures

### 1. Monetary Cost Reductions

One of the findings of the draft Purpose and Need is that Southern Indiana businesses are at a competitive disadvantage due to the relatively high costs associated with the remoteness of the region. Accordingly, a goal of I-69 is to assist businesses and households by reducing their transportation-related costs.

Most major surface transportation projects have a direct effect on the economy that goes beyond the costs of construction and maintenance. This economic impact is the result of (1) time saved, (2) changes in vehicle operating costs, and (3) reductions in traffic accidents. However, not all of the value of these “user benefits” translates into a direct economic impact. For example, while time saved for a recreation trip has a real value, it is not the same as time-saved for work-related traffic that is



“on-the-clock” costing businesses actual cash. Similarly, the value of “pain and suffering” resulting from a traffic accident (as real as it is for the people involved) may not translate into value that finds its way into the economy.

Monetary cost reductions are that subset of highway user benefits that reduce actual costs or increase savings. These have “real money value” which is fed directly into the economy. Note that these dollars are distinct from indirect or induced economic impacts. In the case of the three components comprising this family of performance measures, their dollar value has been added rather than averaged.

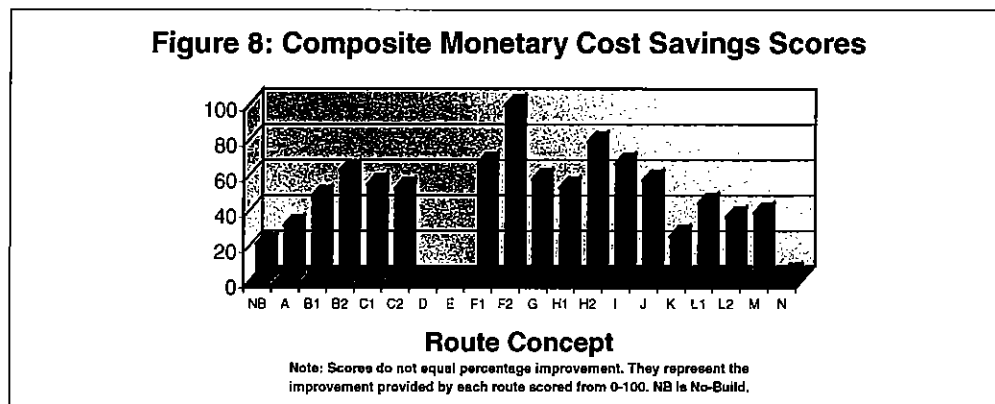


Figure 8 shows the composite scores associated with monetary cost reductions. On this family of performance measures, one alternative stands out above the rest: “F-2”. The next best is “H-2” with a significantly lower score of 79.

It will be noted that in this case the No-Build alternative does *not* have the lowest score. This is a result of the fact that increased speeds associated with new highways usually result in increased vehicle-operating costs; this is especially true for automobiles, though often not for trucks. The net effect of the combined monetary cost reductions for Route Concepts “D”, “E” and “N” is not a savings at all, but rather a cost. Accordingly, on the basis of this group of performance measures, it would be better to do nothing than to build “D”, “E”, or “N”.

## 2. Business Accessibility

Just as southwestern Indiana residents experience poor accessibility, the same observation can be made regarding the area’s businesses. Southwest Indiana businesses must compete with businesses that have far better access to available labor pools and supplier markets. The Council for Urban Economic Development’s (CUED) study conducted as part of the Purpose and Need phase of this Tier 1 EIS cited anecdotal evidence as well as statistical data from economic development literature attesting to the importance of highway access to business success.





Two performance measures are used to assess the potential improvement of alternative route concepts to business accessibility. These are: (1) the percentage improvement in accessibility to labor and consumer markets, and; (2) the percentage improvement in accessibility to buyer and supplier markets. Accessibility to labor and consumer markets is measured as the percentage change in the population reachable within a half-hour drive of key locations in the I-69 Study Area; a half-hour is viewed as a reasonable commuting time. Similarly, accessibility to buyer and supplier markets is measured in terms of the increase in employment within a 3-hour drive time. The composite score for business accessibility is based on the average scores for these two performance measures.

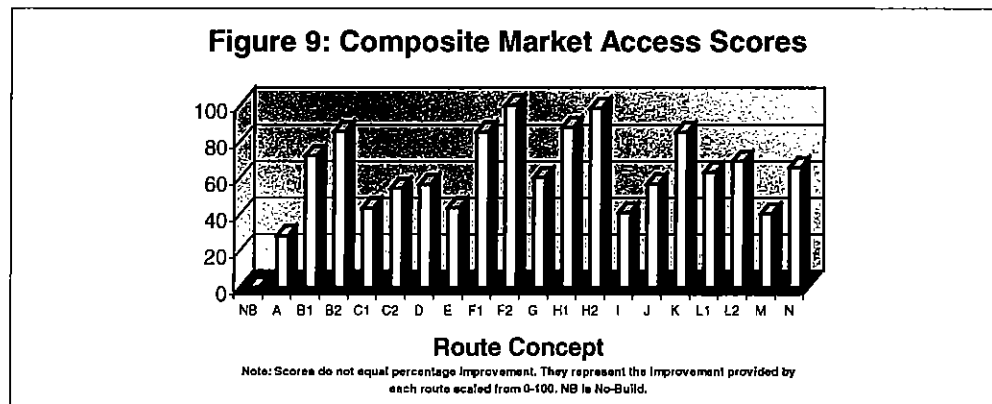


Figure 9 depicts the composite business accessibility scores. As the bar chart suggests, Route Concepts “F-2” and “H-2” are the two high performers with scores above 90. Following these two, there are five routes with composite scores in the 80s. In descending order, these are: “H-1”, “B-2”, “F-1”, and “K”. Following this group, there is a significant drop in scores.

### 3. Long-Term Economic Growth

The Purpose and Need statement reported on long-term, historic trends in percentage employment growth in southwestern Indiana (excluding the Indianapolis MSA) and Indiana as a whole. These growth trends were compared with the United States for the same time period. The trend analysis showed that both the State, as a whole, and southwestern Indiana lagged far behind the nation. Furthermore, additional research has shown that the highest-growth industries in the U.S. are significantly underrepresented in Indiana and the Study Area.<sup>1</sup> Similarly, effective buying income and per-capita personal income have traditionally been lower in the Study Area than the rest of Indiana.<sup>2</sup>

This family of economic growth performance measures is comprised of employment, income, and sales variables. Employment measures consider forecasted net change in employment and

<sup>1</sup> Task Report 3.4: Regional Economic Needs Analysis. Bernardin, Lochmueller & Associates, Inc., September 2001.

<sup>2</sup> This analysis excludes the Indianapolis MSA from both the Study Area and the “rest of the state” since Indianapolis is an economic region in itself and its inclusion would distort the statistics for either area due to its sheer size.



employment in high-growth and high-paying industries.<sup>1</sup> Income measures include net change in real disposable income and net change in farm and forestry income. Estimated change in roadside business sales is the sales variable in this family of performance measures. The reason for including the farm/forestry and roadside business sales variables is to provide a method for appropriately “penalizing” route concepts that might achieve economic growth at the expense of existing businesses. In the latter two cases (farm/forestry and roadside business sales), the *smaller* the negative net change affected by an alternative, the *higher* the score.<sup>2</sup>

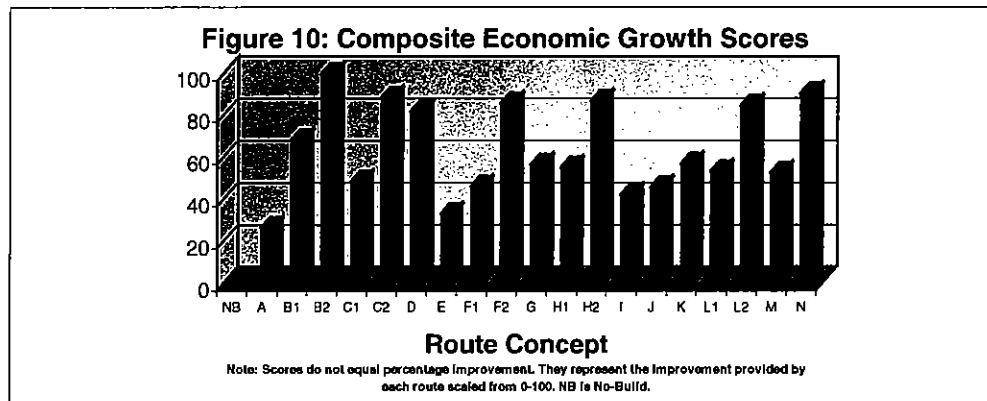


Figure 10 gives the composite scores for long-term economic growth. “B-2” ranks in 1<sup>st</sup> place by a significant margin. Following “B-2”, six route concepts have scores above 80. In descending order, these routes are: “N”, “C-2”, “H-2”, “F-2”, “L-2” and “D”.

#### 4. Social Distribution of Economic Benefits

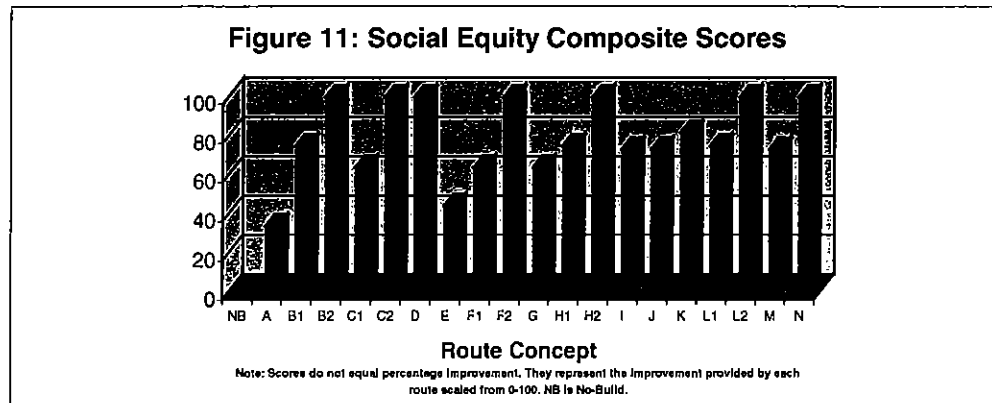
The Draft Purpose and Need statement found a relatively low level of real disposable per capita income in most of southwestern Indiana. Accordingly, there are pockets of serious poverty and comparatively high unemployment rates.

<sup>1</sup> This family of performance measures as well as the next are, in part, dependent on regional econometric modeling that was conducted for only seven of the alternative route concepts. This modeling was not conducted for all 19 “build alternatives” due in large part to the inability of these techniques to accurately forecast differences based on variations in route concepts that do not significantly affect “total highway user benefits” (both monetary and non-monetary). All of the route concepts were assigned to a group represented by a single route for which the analysis was conducted. The performance measures for the routes that were not analyzed were assumed to be the same as those that were explicitly analyzed. With three exceptions, the highway user benefits within each respective group fell within a range of 10% of their mean. The three outliers were so different that they were modeled individually. These three were: “A”, “E”, and “K”. Net change in farm and forest income and estimated change in roadside business sales were computed for each of the 19 “build alternatives”, which explains the small variations in composite route scores among groupings of similar routes that were otherwise analyzed as a group.

<sup>2</sup> Roadside business sales have been computed as a range due to substantial uncertainties about highway alignments in relation to the locations of existing businesses. For this analysis, the low end of the range has been used in order to capture the potential downside effects of a route.



With these concerns in mind, a family of performance measures was developed to assess the social distribution of benefits that could potentially be stimulated by an Interstate highway in southwestern Indiana. Employment, demographic, and income variables comprise this family. Specifically, they are: the forecasted ratio of employment-to-labor force, change in real disposable per-capita income, the change in transfer payments per-capita (i.e., various forms of government assistance to individuals and families), and the change in young working-age population.



The economic model results suggest that, while I-69 would likely stimulate a fairly significant change in real disposable income, there would also be a commensurate increase in population effectively offsetting any measurable increase in disposable per-capita income. Young working-age population, however, would increase and there would be a decline in per-capita transfer payments, suggesting that benefits would accrue to segments of the population near the low end of the socioeconomic spectrum.

The appearance of Figure 11 reflects the fact that econometric modeling was conducted for only 7 of the route concepts. This was done in an effort to avoid the suggestion that long-term regional economic modeling can be done with enough confidence to distinguish meaningful differences in aggregate output between alternative route concepts that are similar. For this reason, the 19 routes (including optional variations) were grouped into like kinds and a single route representative of each group was modeled. The criterion used to aggregate the routes was similarity in terms of their respective (monetary and non-monetary) user benefits. Specifically, "B-1" was modeled to represent: "H-1" and "L-1". Route "C-1" represented "F-1" and "G". "H-2" was selected to represent all of the "option 2" routes (e.g., "B-2", "F-2", etc). It also was used to represent "D" and "N". Route "J" represented routes "I" and "M". Routes "A", "E", and "K" were so unique that they were modeled individually.

There are several findings that can be gleaned from this economic modeling exercise which are reflected in Figure 11. First, Route "J" (and, by inference, "I" and "M") performs about as well "B-1". This suggests that centralized routes which do not make use of the SR 37 corridor may generate about equivalent economic benefits as routes that use SR 37, but then diverge and travel north to I-70. Second, both "B-1" and "J" have higher scores than "C-1" (and, by inference, "F-1" and "G"). This suggests, that routes which skirt SR 37, but do not quite get there may not do as well as those that



make use of SR 37 or take a more direct path to I-70. Third, “H-2” (and, by inference, other routes that make extensive use of SR 37) generates significantly better scores than routes that do not use SR 37. This is a pattern that can also be seen in Figure 11 and in much of the other analysis that has been conducted throughout this study. (Interestingly, Route “K” could be viewed as an exception to this rule, presumably because of its connection to I-65.) Finally, the analysis suggests that Routes “A” and “E” do not perform on par with the other alternatives.

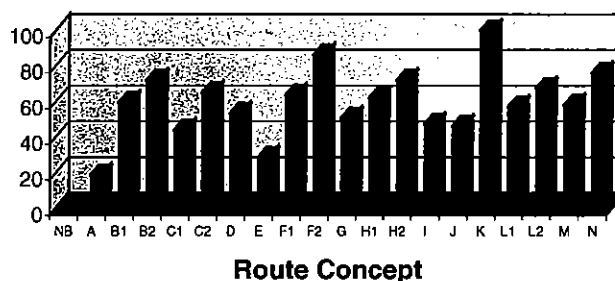
## C. National I-69 Goals/Policy

### 1. Interstate and International Trade

The United States Congress has designated I-69 from Canada to Mexico as a “high-priority corridor” on the National Highway System. Based on that designation, FHWA has established as a matter of national policy that the I-69 Corridor should serve to promote interstate and international trade. Since Indiana’s section of I-69 is part of this larger national and international corridor, the promotion of this federal policy has been adopted as a *core goal*.

Two performance measures have been used for this analysis: design compatibility and facilitation of truck traffic. Design compatibility refers to the termini of the alternative and its design standards. Since all of the alternatives have their termini at Indianapolis and Evansville, they all satisfy this criterion. Similarly, all of the alternatives are highway route concepts that would be designed to Interstate standards.

Figure 12: Scores for Daily Truck-Hours Saved



Note: Scores do not equal percentage improvement. They represent the improvement provided by each route scaled from 0-100. NB is No-Build.

The variable that has been used to measure the potential for national/international trade is daily vehicle-hours of truck traffic saved in the forecast year 2025. Figure 12 shows the performance of each alternative with respect to this measure of trucking efficiency. Only two route concepts have scores above 80: “K” and “F-2”. The relative success of Concept “K” has to do with the congestion relief that it would provide to I-65. The actual data values for daily truck vehicle-hours saved in 2025 can be found in Table 3.



**Table 3: Daily Truck Vehicle-Hours Saved in 2025 by Alternative Route Concept** (rounded to the nearest 100)

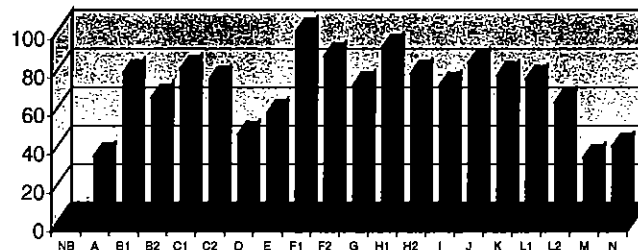
Alternative	Daily Truck-Hours Saved
NB	0
A	900
B1	2,700
B2	3,300
C1	2,000
C2	3,000
D	2,500
E	1,300
F1	2,900
F2	3,900
G	2,300
H1	2,900
H2	3,300
I	2,200
J	2,100
K	4,600
L1	2,600
L2	3,100
M	2,700
N	3,500

Source: Bernardin, Lochmueller & Associates, Inc., September 2001.

## 2. Intermodal Connectivity

The final measure of effectiveness has to do with the potential for the proposed alternatives to service major intermodal facilities. This measure was quantified by developing an accessibility index to the five major intermodal facilities within 100 miles of the I-69 Study Area. These are: the Indianapolis International Airport, the Southwind Maritime Centre in Mt. Vernon Indiana, the CSX Avon Yard in Indianapolis, the CSX Evansville Yard, and Port Clark in New Albany Indiana. The indices are weighted by annual (2000) gross intermodal tonnage serviced by each facility.

**Figure 13: Regional Intermodal Facilities Scores**



Note: Scores do not equal percentage improvement. They represent the improvement provided by each route scaled from 0-100. NB is No-Build.



Figure 13 graphs the composite scores for intermodal connectivity. Two route concepts have scores in excess of 90: "F-1" and "H-1". There is a fairly significant drop in scores following these top two with three routes scoring in the mid-80s: "F-2", "J", and "B-1".

## D. Cost and Mileage Estimates

Table 4 provides cost and mileage estimates for each of the route concepts. All of the estimates are provided in ranges due to the uncertainty of many variables that would have to be known in order to make a more exact estimate. Much of the variability in the mileage estimates is based on the uncertainty of where an alignment might be located in the vicinity of towns within the general corridor.

**Table 4: Capital Cost and Mileage Estimates of the Route Concepts**  
(Constant 2001 Dollars)

Rte. Concept	COST RANGE		DRIVING MILES	
	Minimum	Maximum	Minimum	Maximum
A	\$ 805,460,000	\$ 1,056,810,000	155	158
B-1	\$ 1,591,920,000	\$ 1,897,490,000	150	156
B-2	\$ 1,719,100,000	\$ 1,931,150,000	147	151
C-1	\$ 1,153,890,000	\$ 1,453,740,000	146	149
C-2	\$ 1,483,387,000	\$ 1,747,925,000	145	149
D	\$ 1,855,260,000	\$ 2,115,330,000	164	168
E	\$ 1,191,110,000	\$ 1,473,540,000	150	153
F-1	\$ 1,140,270,000	\$ 1,302,010,000	141	142
F-2	\$ 1,422,010,000	\$ 1,566,450,000	137	139
G	\$ 1,166,470,000	\$ 1,329,150,000	142	143
H-1	\$ 1,462,980,000	\$ 1,661,460,000	141	146
H-2	\$ 1,575,900,000	\$ 1,689,810,000	139	140
I	\$ 913,940,000	\$ 966,050,000	143	143
J	\$ 988,340,000	\$ 1,136,270,000	141	142
K	\$ 1,559,650,000	\$ 1,634,020,000	152	152
L-1	\$ 1,401,640,000	\$ 1,619,670,000	148	152
L-2	\$ 1,514,570,000	\$ 1,648,010,000	146	147
M	\$ 865,950,000	\$ 908,580,000	161	161
N	\$ 1,555,320,000	\$ 1,678,640,000	159	161

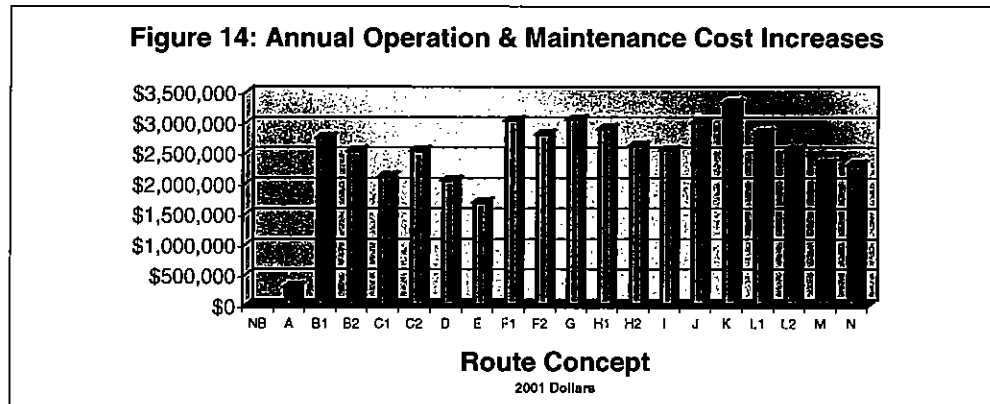
Source: Bernardin, Lochmueller & Associates, Inc., June 2001.

It should be noted that any costs associated with adding lanes to I-70 between SR 46 / SR 641 in Vigo County and I-465 are excluded from the above cost estimates, due to INDOT's decision to treat the eventual expansion of I-70 as a "committed" project. Consequently, the cost for any alternative which would use I-70 has been calculated only up to and including a new interchange with I-70.

Similarly, The US 50 corridor between Washington and Bedford has been identified for potential improvement to a four-lane facility in the Statewide Long-Range Plan. Accordingly, the preliminary cost estimate for these improvements has been deducted from the cost of Route Concept "L".



A factor that was incorporated into the cost estimates was the number of lanes that would likely be required to achieve an acceptable standard of traffic flow at any given location along the route during peak-hour conditions in the forecast year, 2025. This standard for traffic flow is an accepted traffic engineering concept known as level of service (LOS) "C".<sup>1</sup> The lane estimates were developed from computer-modeling 2025 forecasted traffic on each of the route concepts. These lane estimates can be found in the appendix.



In addition to capital costs, I-69 will require an increase in the ongoing operation and maintenance (O&M) cost budgets of INDOT and the Indiana State Police. Figure 14 depicts the estimated O&M costs associated with each alternative. Since Route Concept "A" would result in significantly less new highway mileage than any of the other "build" alternatives, the O&M cost increase associated with it would also be significantly less than those for any other route concept. Note that the unit of measurement in Figure 14 is dollars; it is not a composite score.

<sup>1</sup> A couple of rare exceptions to LOS "C" were allowed on I-70 and SR 37 where the standard was exceeded by a fractional margin.



## V. Screening of the Alternatives

The preceding section was organized around the ten project goals described in the draft Purpose and Need Statement. This section will be organized differently: it will present the results for each alternative individually, highlighting that alternative's relative strengths and weaknesses. As explained below, the alternatives have been presented in geographic groups, which have been used to simplify the description of the screening process. This section is organized as follows:

- Section A describes the approach to the screening process, including the geographic groupings of the alternatives.
- Sections B, C, D, and E provide brief summaries of the performance and cost of each route concepts organized by geographic groupings.
- Section F provides the results for the No-Build alternative.
- Section G presents the alternatives proposed to be carried forward for detailed study.

### A. Approach

To facilitate the screening process, the route concepts were grouped into four geographic categories, which are shown in Table 5 and described below. The four categories were:

- **Western Group** This group included Alternatives **A, C1, C2, and E**. These routes generally follow U.S. 41 for a significant distance, along the western perimeter of the study area. All of these alternatives include a connection to Vincennes, most serve Linton (directly or via a short connection), and none serve the Bloomington area.
- **Central Group – Bloomington Connection** This group included Alternatives **B1, B2, D, F1, F2, G, H1, and H2**. Most of these routes follow SR 57 for a significant distance. All of these routes serve Bloomington, either directly or via a short connection, and all but one of them serve Washington. With one exception, none of these routes serve Vincennes or Linton.
- **Central Group – No Bloomington Connection** This group includes Alternatives **I, J, and M**. These routes generally follow a middle course, staying east of the US 41 corridor but west of Bloomington. All of them provide service to Linton, and two out of the three connect to Washington, but none serve Vincennes and none serve Bloomington.
- **Eastern Group** This group includes Alternatives **K, L1, L2, and N**. These routes all provide connections to one or more locations in the eastern part of the study area: K passes through Brown County, and L1, L2, and N all provide connections to Bedford. No other alternatives provide connections to these locations.

The process of geographic grouping was used in order to assure that a geographically diverse array of alternatives is carried forward for detailed study. Geographic diversity is important in the context of this study for two reasons:





- It is possible that alternatives that currently appear attractive based solely on the performance measures may appear less attractive once their full environmental impacts and costs are known. Similarly, alternatives that appear less attractive now may provide the best balance between benefits, impacts, and costs. Given the many “unknowns,” carrying forward a geographically diverse range of routes provides the best possible chance of finding an alternative that meets project objectives while also meeting environmental concerns and minimizing costs.
- While the proposed project is driven by regional and national needs, the project will undoubtedly have positive and negative impacts at the local level – both in communities where the project is located, and possibly also in communities where it is not located. Carrying forward a diverse range of alternatives will provide an opportunity to consider the interests and viewpoints of all of the potentially affected communities within Southwest Indiana, before making a final decision about which cities, counties, and towns will be directly served by the project.

The screening process involved the computation of an average composite score for each route concept based on the ten sets of performance measures discussed in Section IV and on project costs (both capital and O&M costs). These composite scores were then re-calculated in several different ways in recognition of the fact that not all of the performance measures have the same degree of importance. For example, in some cases, the performance measures associated with the project’s core objectives were given heavier weight than other performance measures. In addition to varying the weights associated with different project goals, the alternatives were also grouped and re-grouped based on several different criteria (e.g., common highway corridors, common geographic areas served, etc). These variations in weights and groupings were developed and analyzed to ensure that the screening conclusions were not artificially based on only one way of considering the data.

These multiple rounds of analysis revealed a remarkable degree of consistency. Assuming the application of a reasonable range of weights, the same alternatives tended to perform well, or perform poorly, regardless of the particular weighting scheme or geographic grouping being used.

Following this analysis, the alternatives were arrayed into the four geographic groups described earlier – Western, Central-Bloomington, Central-Non-Bloomington, and Eastern – and each alternative was assigned an ordinal rating (from one to five stars) for each performance measure and for the two cost categories (from one to five dollar signs). Table 6 shows these ratings. The number of stars assigned in each category was based on the alternative’s (unweighted) performance score; a score between 0 and 20 received a one-star rating; scores between 21 and 40 received a two-star rating, etc. The cost ratings were assigned in the same manner.

Following this rating process, judgments were made about which alternatives to keep. These judgments were made in two steps, which are depicted in Table 6 and explained below:

- First, in each geographic grouping, clearly inferior alternatives were eliminated. Considering both performance and cost, alternatives were eliminated if they had a significant weakness in comparison to other alternatives in the same grouping.
- Alternatives that were not eliminated in the first step were then consolidated into hybrid alternatives if they were very similar in concept. These hybrid alternatives were then re-named as Alternatives 1-5, for ease of reference in the remainder of the study.



The outcome of this analysis is summarized in general terms in Table 6 and is explained in further detail in the technical appendix.

Finally, it is important to add a caveat regarding subsequent stages of the environmental analysis. In general, alternatives are carried forward for detailed study in an EIS only if they clearly satisfy the project's objectives, as defined in the purpose and need statement. In this case, the desire to carry forward a geographically diverse range means that the performance of certain alternatives is marginal on certain performance measures – including measures related to core project objectives. Despite their weaknesses, these marginal alternatives are being carried forward; however, the possibility still exists that one or more of these alternatives will ultimately be found to be unreasonable. Also, the fact that an alternative is being carried forward at this stage does not signify that FHWA and INDOT consider that alternative to be prudent or practicable for purposes of any applicable resource-protection statutes.

## **B. Western Group**

### **1. Route Concept “A”**

Like the No-Build Alternative, the major strength of Alternative “A” is its relatively low cost. Since the entire length of this route follows an existing 4-lane, divided highway, the incremental increase in its operation and maintenance cost is very low; in fact, regarding O&M costs, it is in a class by itself when compared to any of the other alternatives. Similarly, in terms of construction costs, it is one of the two least expensive “build” alternatives, based on current estimates, and in the end it could be the least expensive.

On the other hand, “A” performs relatively poorly by comparison to most of the other routes in terms of its ability to achieve the project's objectives. This fact is the result of its inability to provide benefits by any other means than a comparatively small increase in speed and the removal of at-grade access on an existing route. Among the “build” alternatives, it ranks lowest or next to lowest on seven out of the ten families of performance measures.

### **2. Route Concept “C-1”**

Among the families of performance measures, the highest ranking received by Route “C-1” is 5<sup>th</sup> place for intermodal accessibility. Its scores put it in 8<sup>th</sup> place for Evansville-Indianapolis travel time savings and monetary user benefits. In terms of expense, it ranks 7<sup>th</sup> and 4<sup>th</sup> for capital and O&M costs, respectively. However, it should be pointed out, that its 4<sup>th</sup> place ranking for O&M costs is still several times more expensive than Route “A”.

Alternative “C-1's” weaknesses are in the areas of traffic congestion relief, national/international transportation, and long-term economic growth, all categories in which it ranked 17<sup>th</sup>. It also ranks in 16<sup>th</sup> place for business accessibility and 15<sup>th</sup> place for improving personal accessibility – one of the project's core goals.



### **3. Route Concept “C-2”**

Route Concept “C-2” performs better than “C-1” for all but three families of performance measures. It is one of the strong performers relative to the social distribution of economic benefits. It garners 7<sup>th</sup> place scores for traffic safety and long-term economic growth and has 10<sup>th</sup> place rankings for travel time savings and personal accessibility.

Among the “build” alternatives, “C-2” ranks in 14<sup>th</sup> and 7<sup>th</sup> places for capital and O&M costs, respectively. The 12<sup>th</sup> place capital cost ranking is about 6% above the mean for all the “build” alternatives.

### **4. Route Concept “E”**

Alternative “E” has very little to commend it. Unlike Route Concept “D”, its rankings are consistently poor across the board. It has most of the disadvantages associated with Alternative “A” without the advantage of a low price tag.

## **C. Central Group – With Bloomington Connection**

### **1. Route Concept “B-1”**

A strength of this alternative is its 5<sup>th</sup> place ranking on the personal accessibility scale. Even so, this is not a distinguishing trait, since there are three other routes with slightly poorer rankings that do almost as well. “B-1” also does a good job improving intermodal accessibility (i.e., 6<sup>th</sup> place), one of the national I-69 performance measures. Overall, “B-1” is a reasonably strong route concept. This, however, is not because it is outstanding in any particular category, but rather because it does not have any particularly low rankings. On the other hand, among the “build” alternatives it is one of the most expensive route concepts, ranking 17<sup>th</sup> for capital costs and 12<sup>th</sup> for O&M costs.

### **2. Route Concept “B-2”**

From the viewpoint of performance measures, Route Concept “B-2” proves to be one of the best alternatives. It ranks 2<sup>nd</sup> for traffic congestion relief and long-term economic growth, 3<sup>rd</sup> for personal accessibility improvement and traffic safety, 4<sup>th</sup> for business accessibility, and 5<sup>th</sup> for monetary user benefits and national/international transportation. It ranks 1<sup>st</sup> for social equity (i.e., Family 7), although this is a distinction shared with seven other routes. On most of the performance measures, Alternative “B-2” has better scores than “B-1”. This is consistent with a pattern in which routes that follow the SR 37 corridor north of Martinsville do a superior job to otherwise identical routes that follow SR 39 to I-70.

The cost of “B-2” is its major weakness. Out of 19 “build” alternatives, this route is the second most expensive in terms of capital costs. Moreover, although it does well on most of the performance measures, it ranks only 14<sup>th</sup> in its ability to reduce travel times between Evansville and Indianapolis – one of the core objectives of the highway.



### **3. Route Concept “D”**

Route Concept “D” is the alternative of extremes. It tends to perform relatively well or relatively poorly, although on balance Route Concept “D” is not a strong alternative. Of all the “build” alternatives, it would be the most expensive to construct, fully 40% above the average route’s capital cost (although it ranks in 3<sup>th</sup> place for O&M costs). It ranks in 19<sup>th</sup> place for travel time savings and last place (behind the No-Build) for monetary user benefits. On the other hand, it is the best of all the alternatives in terms of improving traffic safety and ties for 1<sup>st</sup> place in the social distribution of economic benefits (along with several others).

### **4. Route Concept “F-1”**

Route Concept “F-1” performs either very well or about average. The major exception to this rule is in the area of O&M costs, where it is among the most expensive due to its large increase in new road mileage. “F-1” ranks in 1<sup>st</sup> place for improved Evansville-Indianapolis connectivity (one of the core objectives). “F-1” also ranks in 1<sup>st</sup> place for intermodal accessibility, 3<sup>rd</sup> place for monetary user benefits, and 5<sup>th</sup> place for business accessibility. It is the 5<sup>th</sup> least expensive in terms of capital costs.

Its poorest-ranking performance is in the category of improved traffic safety (15<sup>th</sup> place), although its actual composite score for this performance measure is clustered at the low end of five alternatives that have scores within 5 points of each other. It also scores a 15<sup>th</sup> place rank for social distribution of economic benefits and 14<sup>th</sup> for long-term economic growth.

### **5. Route Concept “F-2”**

Overall, Route Concept “F-2” is the best performing of all the alternatives. It scores in 1<sup>st</sup> place for monetary user benefits and business accessibility and is tied in 1<sup>st</sup> place for the social distribution of economic benefits. It holds 2<sup>nd</sup> place for Evansville-Indianapolis connectivity (i.e., travel time savings) and national/international transportation, both of which are core objectives. It is in 3<sup>rd</sup> place for improved traffic congestion and intermodal accessibility. Among the performance families, “F-2’s” poorest ranking is 6<sup>th</sup> place, for personal accessibility, traffic safety, and intermodal accessibility.

In regard to cost, “F-2” falls in the middle of the range of capital costs for “build” alternatives. Including the No-Build Alternative, it is ranked 9<sup>th</sup> in capital costs and 13<sup>th</sup> in O&M costs.

### **6. Route Concept “G”**

Route Concept “G” is an alternative that looks like, and in some important respects, performs like “F-1”. In concept, “G” differs from “F-1” only in its southern terminus, which is offset to the east of I-164. “G” is like “F-1” in terms of personal accessibility, traffic congestion, traffic safety, and cost. It is also reasonably similar in terms of monetary user benefits. It is quite different, however, in terms of the Evansville-Indianapolis connection, national/international transportation, and intermodal accessibility – all measures on which “F-1” does significantly better. With the exception of monetary user benefits (6<sup>th</sup> place), it does not perform especially well among the economic development performance families.



## **7. Route Concept “H-1”**

Route Concept H-1 has several strong points. It is ranked 2<sup>nd</sup> in terms of personal accessibility and intermodal accessibility and 3<sup>rd</sup> in the category of business accessibility and improving the travel time between Evansville and Indianapolis. It also has solid mid-range rankings for traffic safety, national/international transportation, and monetary user benefits. Its only relatively poor score is for traffic congestion relief with a ranking of 15<sup>th</sup> place.

In terms of cost, with a rank of 11<sup>th</sup> among the “build” alternatives, “H-1” is about 10% more expensive than the average route concept. It is ranked quite poorly (15<sup>th</sup>) for O&M costs because of its comparatively large increase in new highway mileage.

## **8. Route Concept “H-2”**

In terms of performance measures, Route Concept “H-2” is very similar to “F-2”. On nearly all measures, it scores highly. It is ranked 1<sup>st</sup> for personal accessibility (a core objective) and 2<sup>nd</sup> for monetary user benefits and business accessibility. Like “F-2”, it also has high scores for facilitating national/international transportation, long-term economic growth, traffic safety, and traffic congestion relief. It is ranked in 6<sup>th</sup> place for improving Evansville-Indianapolis travel time. Its lowest ranking is 7<sup>th</sup> for intermodal accessibility.

The weakness of Alternative “H-2”, however, is its cost. It is ranked 16<sup>th</sup> out of the 19 “build” alternatives for capital costs. It does moderately better with a rank of 11<sup>th</sup> for O&M costs.

## **D. Central Group – Without Bloomington Connection**

### **1. Route Concept “I”**

Overall, Route Concept “I” delivers an average and, in some cases, poor performance. The notable exceptions to this rule have to do with monetary user benefits (4<sup>th</sup> place) and reducing Evansville-Indianapolis travel time (5<sup>th</sup> place).

Its major advantage is cost. Out of the 19 “build” alternatives, Route Concept “I” ranks 3<sup>rd</sup> in terms of capital costs, about 65% of the average route cost. It has a mid-range ranking for O&M costs.

### **2. Route Concept “J”**

Route Concept “J” performs much like “I” due to the similarity of its location. In almost all cases, “J”’s scores mirror “I”. It does, however, score significantly better for intermodal accessibility due to its more direct service to the west side of Indianapolis where the Airport and CSX Avon Yard are located. In terms of capital costs, it is slightly more expensive than “I”, but still significantly below the mean for all “build” alternatives. Its capital cost rank is 3<sup>rd</sup> place. It is quite expensive for ongoing O&M costs (16<sup>th</sup> place).



### **3. Route Concept “M”**

Aside from cost, Alternative “M” has little to commend it. Its best ranking is 10<sup>th</sup> place for national/international transportation. It ranks 18<sup>th</sup> on two families of performance measures and 19<sup>th</sup> on another. Its generally poor performance can be explained in large part by its lack of direct connectivity to Evansville, which is seen in its rank of 17<sup>th</sup> for Evansville-Indianapolis travel time savings (a core objective).

On the other hand, this route concept is relatively inexpensive, both in terms of capital costs and O&M costs. Among the “build” alternatives, its capital cost ranks in 1<sup>st</sup> place, about on par with Route Concept “A”. This is the result of comparatively short construction mileage. It has a rank of 6<sup>th</sup> place for O&M costs.

## **E. Eastern Group**

### **1. Route Concept “K”**

This alternative functions in a class by itself. On some performance measures, “K” is exceptionally strong. As a result of its atypical routing that connects with I-65 in Johnson County, it ranks in 1<sup>st</sup> place for traffic congestion relief. It also ranks 1<sup>st</sup> for national/international transportation due to the fact that it improves both the I-69 and I-65 corridors. It does reasonably well with respect to business accessibility (6<sup>th</sup> place) and 8<sup>th</sup> place for intermodal accessibility.

On the other hand, its performance is only average (and sometimes poor) on most of the remaining families of performance measures. Because of its increase in vehicle-miles of traffic, it ranks 16<sup>th</sup> for monetary user benefits. Moreover, it is only 13<sup>th</sup> for personal accessibility and travel time and 14<sup>th</sup> for intermodal accessibility.

### **2. Route Concept “L-1”**

Alternative “L-1” is a fairly consistent mid-range route. It neither ranks at the top nor the bottom of any of the performance measures. Its best rank is 8<sup>th</sup> place for traffic safety and for personal accessibility. It also has a respectable rank (9<sup>th</sup> place) and composite score for intermodal accessibility and the social distribution of economic benefits. It is in 9<sup>th</sup> place, but has only an average score for long-term economic growth. In terms of capital costs, “L-1” is ranked 10<sup>th</sup>. It is relatively expensive in terms of O&M costs with a rank of 14<sup>th</sup> place.

### **3. Route Concept “L-2”**

Route Concept “L-2” is generally a good performer. As is true of all the routes that have optional northern sections near Indianapolis, the option that follows SR 37 all the way to I-465 (Option 2) performs better on most performance measures than the option that follows SR 39 connecting to I-70 (Option 1). For the most part, “L-2” conforms to this same pattern of better performance than “L-1”. It does especially well with respect to long-term economic growth (3<sup>rd</sup> place), traffic safety and traffic congestion relief (4<sup>th</sup> place), and social distribution of economic benefits (1<sup>st</sup> place). With the



exception of “D”, neither of the “L” routes performs as well as the other options that connect to SR 37 farther north.

Alternative “L-2” is somewhat more expensive than “L-1”, ranking 12<sup>th</sup> as opposed to 10<sup>th</sup> with respect to capital costs. Its O&M costs, however, are less, ranked 9<sup>th</sup> as opposed to 14<sup>th</sup>.

#### **4. Route Concept “N”**

Alternative “N” is a combination of “L-2” and “M”. Accordingly, its performance is generally consistent with these two routes. Its greatest strength is a 1<sup>st</sup> place ranking for long-term economic growth and the social distribution of economic benefits. It is also very strong with respect to traffic safety. From the viewpoint of traffic safety, it is virtually tied in 1<sup>st</sup> place with Alternative “D”. It is ranked 3<sup>rd</sup> and 4<sup>th</sup> for national/international transportation and personal accessibility, respectively.

On the other hand, Route “N” has some very low ratings. It is ranked in 18<sup>th</sup> place for improving the Evansville-Indianapolis travel time connection (a core objective), 18<sup>th</sup> for monetary user benefits, and 17<sup>th</sup> place for intermodal accessibility. In terms of capital costs, it is somewhat more expensive than “L-1” and “L-2” (ranked 15<sup>th</sup>), although its O&M costs are ranked considerably better, in 6<sup>th</sup> place.

### **F. The No-Build Alternative**

While the No-Build Alternative does nothing to achieve any of the goals of I-69, it also requires no capital outlay for construction and causes no increase in operation and maintenance costs. Over time, it implies increasing costs to society in terms of modest worsening of congestion with associated increases in traffic accidents, travel times, and other related costs. On most of the performance measures, it ranks in last (i.e., 20<sup>th</sup>) place. Accordingly, it is the benchmark against which the other alternatives are measured.

Interestingly, in addition to capital and O&M costs, there is another category of cost that is not incurred by the No-Build Alternative: namely, increases in vehicle operating costs. All of the “build” alternatives result in a net increase in vehicle operating costs due to higher speeds and an overall increase in vehicle-miles of traffic. For this reason, the No-Build Alternative ranks in 17<sup>th</sup> place rather than last place in Monetary User Benefits (i.e., Family 5).

### **G. Alternatives Recommended for Detailed Study**

The route concepts have been exhaustively analyzed using a range of analytical methods to assess their ability to meet the various performance measures, while minimizing cost and ensuring geographic diversity in the set of alternatives carried forward for detailed study.

Given the large number of performance measures, as well as the need to consider geographic diversity and cost, there is no single formula or threshold that could be used to determine which alternatives “meet” the purpose and need or which alternatives are “best” overall. Rather, it has been



necessary to examine the alternatives from several different perspectives using a variety of methods, as described briefly in Section V, A above.

The screening process resulted in the selection of the following alternatives for detailed study:

## **1. Western Group**

Within the Western group of alternatives, the following route concepts will be carried forward for detailed study:

- **Alternative 1** (Route Concept “A”) fairly consistently performs better than its major geographic competitor: “E”. While it generally does not have high performance scores, it is at the very low end of the cost spectrum and maintains a high level of support from a significant segment of the public and important stakeholder groups.
- **Alternative 2** (Route Concepts “C-1” and “C-2”) offers reasonably good performance scores and simultaneously combines service to Princeton and Vincennes with elements of a direct route to Indianapolis.

## **2. Central Group - Bloomington**

Within the Central – Bloomington group of alternatives, the following concepts will be carried forward for detailed study:

- **Alternative 3** is based on Route Concepts “F-1” and “F-2,” with an optional connection to Bloomington that would be similar to “H-1” and “H-2.” These options – in particular F2 – consistently deliver high composite performance scores. Option “F-2” is one of only two alternatives that simultaneously makes use of SR 37 and avoids passing through the City of Bloomington, while still serving it. In relative terms, the estimated capital costs of Route Concept “F” are in the low-to-mid-range (among the “build” alternatives). The “H” routes are also strong performers and offer an alternative connection with SR 37.

## **3. Central Group – Non-Bloomington**

- **Alternative 4** is based on Route Concept “J.” It is proposed as a mid-course alternative both geographically and in terms of performance. It also has a comparatively low price tag. While “I” and “J” are quite similar, “J” performs slightly better than “I”. Moreover, it is significantly better than “M”.

## **4. Eastern Group**

- **Alternative 5** is based on Route Concepts “L-1” and “L-2.” These alternatives are the best of the alternatives serving the eastern part of the I-69 Study Area. Overall, it is a good performer with the added feature of improving accessibility to the cities of Bedford and, indirectly, Jasper.





## **H. Summary**

As Table 6 suggests, related route concepts recommended for advancement have been consolidated into alternatives identified by a number. These numbered alternatives are broadly defined in terms of the cities that they connect and the highway corridors that they utilize. They are defined broadly enough to allow for some flexibility in modifying and/or combining sections of related route concepts that have been studied to date. This flexibility may be needed in order to define a preferred corridor that ultimately avoids or minimizes adverse impacts to southwestern Indiana's environmental resources.

For the alternatives that include I-70 or SR 37 optional approaches to the Indianapolis area, the performance measures consistently favor option 2 (i.e., the routing that makes the greatest use of SR 37). However, a normal part of the environmental process involves making modifications as more detailed information becomes available and this may become necessary.

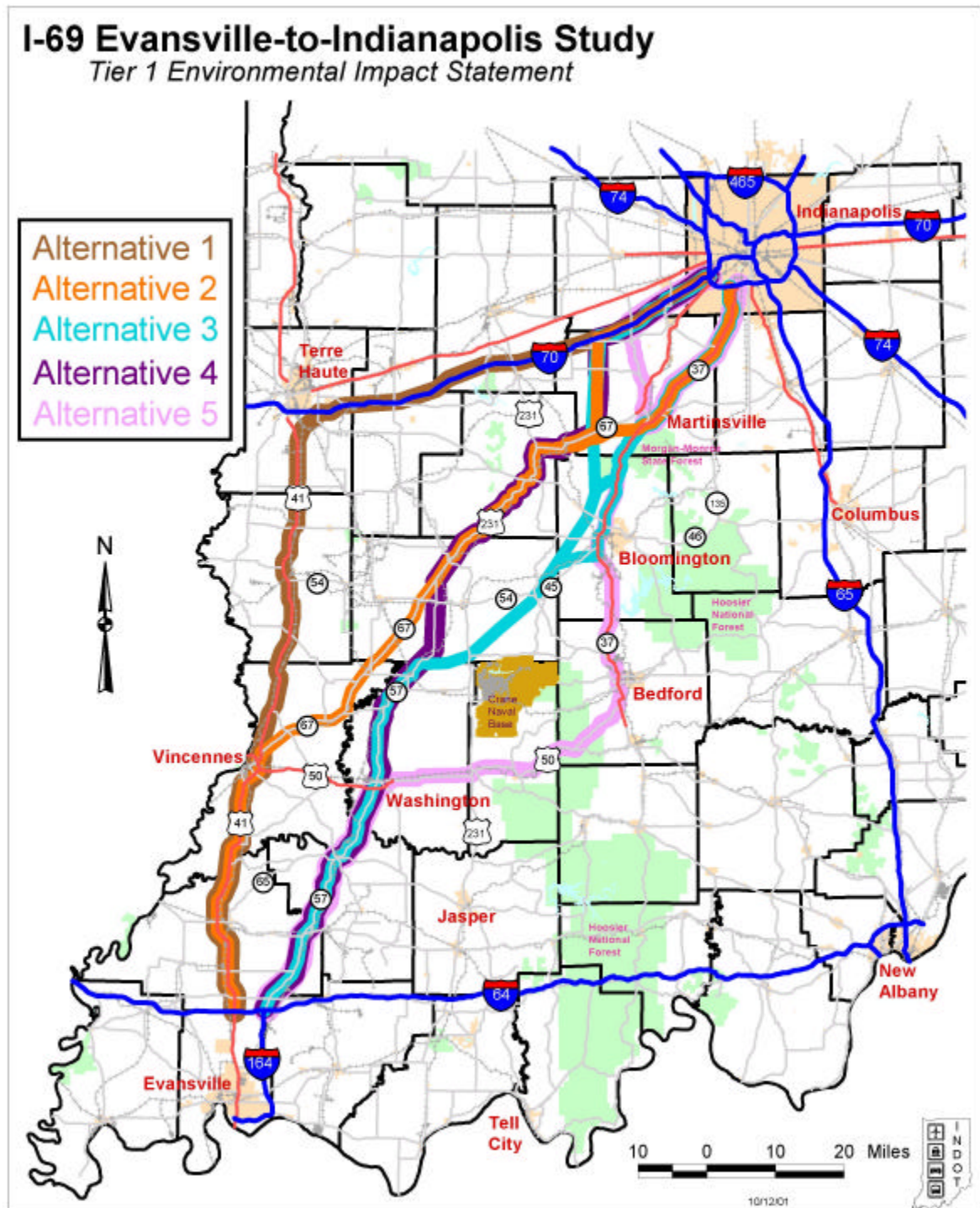
Based on the analysis described in this report and other supportive technical documentation, the following alternatives are recommended for advancement to Level 3. Figure 15 shows the general locations of these alternatives.

- ✓ **Alternative 1: Evansville to Vincennes to Terre Haute to Indianapolis**
- ✓ **Alternative 2: Evansville to Vincennes, then proceeding along the SR 67 corridor to Morgan County with the option of proceeding to I-70 or SR 37 and on to Indianapolis**
- ✓ **Alternative 3: Evansville to Washington, then proceeding along the SR 57 and SR 67 corridors to Morgan County where it diverges from SR 67 and proceeds to I-70 and on to Indianapolis**
- ✓ **Alternative 4: Evansville to Washington, then proceeding to the general Bloomington area and on to Martinsville via SR 37 with the option of using the SR 37 corridor to Indianapolis or deviating off SR 37 to I-70 and on to Indianapolis**
- ✓ **Alternative 5: Evansville to Washington, then proceeding east along the US 50 corridor to Bedford and on to Bloomington and Indianapolis via SR 37**

The No-Build alternative will also be retained for consideration throughout the study.



**Figure 15: Alternatives Recommended for Advancement to Level 3**





## **VI. Where we go from here**

We have reached a major milestone in the Evansville-to-Indianapolis Tier 1 Environmental Impact Statement. Just as there was a round of public meetings after the last milestone – the draft Purpose and Need – another round of public meetings will be scheduled within the next several weeks to present the findings and recommendations of the Alternatives Analysis and to receive feedback.

Work will now proceed with Level 3 of the tiered environmental study. During this phase, the focus of study will be on refining the alternatives into better-defined corridors. Unlike Level 2, which concentrated on broad regional planning considerations, Level 3 will study in some detail the environmental impacts and issues associated with these corridors.

The next major milestone will be the publication of the draft environmental impact statement (DEIS) scheduled for the Spring or Summer of 2002. At that time there will be another round of public meetings, which will serve as the official public hearings for this study. In the meantime, opportunities for ongoing public involvement will continue through the newsletter, the Issues Involvement Team, the project hotline, media communications, and meetings with interested parties.

Table 5: Geographic Grouping of Alternatives

		Western Group				Central Group (Bloomington)								Central Group (Non-Bloomington)			Eastern			
		A	C1	C2	E	B1	B2	D	F1	F2	G	H1	H2	I	J	M	K	L1	L2	N
Cities Served	Evansville	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Princeton	X	X	X	X	X	X													
	Vincennes	X	X	X	X			X												
	Linton		X	X	X			X						X	X	X				
	Washington					X	X		X	X	X	X	X	X	X		X	X	X	
	Bloomington					X	X	X	X	X	X	X	X				X	X	X	
	Jasper															X				X
	Bedford																	X	X	X
	Martinsville			X		X	X	X		X		X	X					X	X	X
	Indianapolis	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X



Table 6: Screening and Consolidation of Route Concepts by Major Geographic Region Served

Goal	Objective (Bold Caps = Core Objective)	Western				Central Bloomington								Central Non-Bloomington			Eastern			
		A	C1	C2	E	B1	B2	D	F1	F2	G	H1	H2	I	J	M	K	L1	L2	N
Transportation	INDY-EVV CONNECTION	***	****	****	***	***	***	*	*****	*****	***	*****	*****	*****	*****	**	***	*****	***	*
	PERSONAL ACCESSIBILITY	**	***	****	**	*****	*****	*****	***	*****	***	*****	*****	**	***	*****	***	*****	*****	*****
	Traffic Congestion Relief	*	***	***	*	****	****	****	***	****	***	***	****	***	***	***	*****	***	****	***
	Traffic Safety	***	***	*****	***	****	*****	*****	***	*****	***	****	*****	**	***	***	***	*****	*****	*****
Economic Development	Monetary User Benefits	**	***	***	*	***	****	*	****	*****	***	***	****	****	***	**	**	***	**	*
	Business Markets Accessibility	**	***	***	***	****	*****	***	*****	*****	****	*****	*****	***	***	***	*****	****	****	****
	Long-Term Economic Growth	*	*	****	*	***	*****	****	**	****	***	***	*****	**	***	***	***	***	*****	*****
	Social Distribution of Benefits	**	****	*****	***	****	*****	*****	****	*****	****	****	*****	****	*****	****	*****	****	*****	*****
National I-69	INTERSTATE/INTERNAT'L TRADE	*	***	***	**	***	****	***	****	*****	***	****	*****	***	***	***	*****	***	****	****
	Intermodal Accessibility	**	*****	****	***	****	****	***	*****	*****	***	*****	*****	*****	*****	**	***	****	****	***
Costs	Capital Costs	\$	\$\$	\$\$\$\$	\$\$\$	\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$	\$\$\$	\$\$	\$\$\$\$	\$\$\$\$	\$	\$	\$	\$\$\$\$	\$\$\$	\$\$\$\$	\$\$\$\$
	O&M Costs	\$	\$\$\$\$	\$\$\$\$	\$\$\$	\$\$\$\$\$	\$\$\$\$	\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$	\$\$\$\$	\$\$\$\$\$	\$\$\$\$	\$\$\$\$\$	\$\$\$\$\$	\$\$\$\$	\$\$\$\$
Eliminate Weaker Alts					X	X	X	X			X			X		X	X			X
Consolidate Stronger Alts		A	C1 + C2						F1 + F2 (with "H Option")						J			L1 + L2		
Alts Carried Forward		1	2						3						4			5		

Source: Bernardin-Lochmueller & Associates, Inc. September 2001